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ZOO NOMIA;
OR,
THE LAWS
OF
ORGANIC LIFE.

IN FOUR VOLUMES.

By ERASMUS DARWIN, M.D. F.R.S.

AUTHOR OF THE BOTANIC GARDEN.

Principiò celum, ac terras, camposque liquentes,
Lucentemque globum lunæ, titanique afra,
Spiritus intus alit, totamque infusa per artus
Mens agitat molem, et magno se corpore miscet.

VIRG. Æn. vi.

Earth, on whose lap a thousand nations tread,
And Ocean, brooding his prolific bed,
Night's changeful orb, blue pole, and silvery zones,
Where other worlds encircle other suns,
One mind inhabits, one diffusive Soul
Wields the large limbs, and mingles with the whole.

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Z O O N O M I A.

The Orders and Genera of the Third Class of Diseases.

CLASS III.

DISEASES OF VOLITION.

ORDO I.

Increased Volition.

GENERA.

1. With increased actions of the muscles.
2. With increased actions of the organs of sense.

ORDO II.

Decreased Volition.

GENERA.

1. With decreased actions of the muscles.
2. With decreased actions of the organs of sense.

*The Orders, Genera, and Species, of the Third
Class of Diseases.*

CLASS III.

DISEASES OF VOLITION.

ORDO I.

Increased Volition.

GENUS I.

With Increased Actions of the Muscles.

SPECIES.

1. <i>Ja^{ct}itatio.</i>	Restlessness.
2. <i>Tremor febrilis.</i>	Febrile trembling.
3. <i>Clamor.</i>	Screaming.
4. <i>Risus.</i>	Laughter.
5. <i>Convulso.</i>	Convulsion.
— <i>debilis.</i>	— weak.
6. — <i>dolorifica.</i>	— painful.
7. <i>Epilepsia.</i>	Epilepsy.
8. — <i>dolorifica.</i>	— painful.
9. <i>Somnambulismus.</i>	Sleep-walking.
10. <i>Asthma convulsivum.</i>	Asthma convulsive.
11. — <i>dolorificum.</i>	— painful.
	12. <i>Stridor.</i>

12. <i>Stridor dentium.</i>	Gnashing of the teeth.
13. <i>Tetanus trismus.</i>	Cramp of the jaw.
14. —— <i>dolorificus.</i>	—— painful.
15. <i>Hydrophobia.</i>	Dread of water.

GENUS II.

With increased Actions of the Organs of Sense.

SPECIES.

1. <i>Mania mutabilis.</i>	Mutable madness,
2. <i>Studium inane.</i>	Reverie.
3. <i>Vigilia.</i>	Watchfulness.
4. <i>Erotomania.</i>	Sentimental love.
5. <i>Amor sui.</i>	Vanity.
6. <i>Noftalgia.</i>	Desire of home.
7. <i>Spes religiosa.</i>	Superstitious hope.
8. <i>Superbia stemmatis.</i>	Pride of family.
9. <i>Ambitio.</i>	Ambition.
10. <i>Mæror.</i>	Grief.
11. <i>Tædium vitæ.</i>	Irksomeness of life.
12. <i>Defiderium pulchritudinis.</i>	Loss of Beauty.
13. <i>Paupertatis timor.</i>	Fear of poverty.
14. <i>Lethi timor.</i>	—— of death,
15. <i>Orti timor.</i>	—— of Hell.
16. <i>Satyriasis.</i>	Lust.
17. <i>Ira.</i>	Anger.
18. <i>Rabies.</i>	Rage.
19. <i>Citta.</i>	Depraved appetite.
	20. <i>Cacoſtitia.</i>

20. <i>Caecitia.</i>	Aversion to food.
21. <i>Syphilis imaginaria.</i>	Imaginary pox.
22. <i>Psora imaginaria.</i>	— itch.
23. <i>Tabes imaginaria.</i>	— tabes.
24. <i>Sympathia aliena.</i>	Pity.
25. <i>Educatio heroica.</i>	Heroic education.

ORDO II.

Decreased Volition.

GENUS I.

With decreased Actions of the Muscles.

SPECIES.

1. <i>Lassitudo.</i>	Fatigue.
2. <i>Vacillatio senilis.</i>	See-saw of old age.
3. <i>Tremor senilis.</i>	Tremor of old age.
4. <i>Brachiorum paralysis.</i>	Palsy of the arms.
5. <i>Raucedo paralytica.</i>	Paralytic hoarseness.
6. <i>Vesica urinaria paralysis.</i>	Palsy of the bladder.
7. <i>Recti paralysis.</i>	Palsy of the rectum.
8. <i>Pareps voluntaria.</i>	Voluntary debility.
9. <i>Catalepsis.</i>	Catalepsy.
10. <i>Hemiplegia.</i>	Palsy of one side.
11. <i>Paraplegia.</i>	Palsy of the lower limbs.
12. <i>Somnus.</i>	Sleep.
13. <i>Incubus.</i>	Night-mare.
14. <i>Lethargus.</i>	Lethargy.
	15. <i>Syncope</i>

CLASS III. 2. 2. OF VOLITION.

5

15. *Syncope epileptica.* Epileptic fainting.
16. *Apoplexia.* Apoplexy.
17. *Mors a frigore.* Death from cold.

GENUS II.

With decreased Actions of the Organs of Sense.

SPECIES.

1. *Recollectionis jactura.* Loss of recollection.
2. *Stultitia voluntaria.* Voluntary folly.
3. *Credulitas.* Credulity.

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CLASS

CLASS III.

DISEASES OF VOLITION.

ORDO I.

Increased Volition.

GENUS I.

Increased Actions of the Muscles.

We now step forward to consider the diseases of volition, that superior faculty of the sensorium, which gives us the power of reason, and by its facility of action distinguishes mankind from brute animals; which has effected all that is great in the world, and superimposed the works of art on the situations of nature.

Pain is introduced into the system either by excess or defect of the action of the part. (Sect. IV. 5.) Both which circumstances seem to originate from the accumulation of sensorial power in the affected organ. Thus when the skin is exposed to great cold, the activity of the cutaneous vessels is diminished, and in consequence an accumulation of sensorial power obtains in them, because they are usually excited into incessant motion by the stimulus of heat, as explained in Sect. XII. 5. 2. Contrarywise, when the vessels of the skin are exposed to great heat, an excess of sensorial power is also produced in them, which

CLASS III. I. I. OF VOLITION.

which is derived thither by the increase of stimulus above what is natural.

This accounts for the relief which is received in all kinds of pain by any violent exertions of our muscles or organs of sense; which may thus be in part ascribed to the exhaustion of the sensorial power by such exertions. But this relief is in many cases so instantaneous, that it seems nevertheless probable, that it is also in part owing to the different manner of progression of the two sensorial powers of sensation and volition; one of them commencing at some extremity of the sensorium, and being propagated towards the central parts of it; and the other commencing in the central parts of the sensorium, and being propagated towards the extremities of it; as mentioned in Sect. XI. 2. 1.

These violent voluntary exertions of our muscles or ideas to relieve the sensation of pain constitute convulsions and madness; and are distinguished from the muscular actions owing to increased sensation, as in sneezing, or coughing, or parturition, or *ejactio feminis*, because they do not contribute to dislodge the cause, but only to prevent the sensation of it. In two cases of parturition, both of young women with their first child, I have seen general convulsions occur from excess of voluntary exertion, as above described, instead of the actions of particular muscles, which ought to have been excited by sensation for the

exclusion of the fetus. They both became insensible, and died after some hours; from one of them the fetus was extracted in vain. I have heard also of general convulsions being excited instead of the actions of the musculi acceleratores in the *ejectio feminis*, which terminated fatally. See Class III. 1. 1. 7.

These violent exertions are most frequently excited in consequence of those pains, which originate from defect of the action of the part. See Sect. XXXIV. 1. and 2. The pains from excess and defect of the action of the part are distinguishable from each other by the former being attended with increase of heat in the pained part, or of the whole body; while the latter not only exist without increase of heat in the pained part, but are generally attended with coldness of the extremities of the body.

As soon as these violent actions of our muscular or sensual fibres for the purpose of relieving pain cease to be exerted, the pain recurs; whence the reciprocal contraction and relaxation of the muscles in convulsion, and the intervals of madness. Otherwise these violent exertions continue, till so great a part of the sensorial power is exhausted, that no more of it is excitable by the faculty of volition; and a temporary apoplexy succeeds, with snoring as in profound sleep; which so generally terminates epileptic fits.

When these voluntary exertions become so connected

CLASS III. I. I. OF VOLITION.

connected with certain disagreeable sensations, or with irritations, that the effort of the will cannot restrain them, they can no longer in common language be termed voluntary; but nevertheless belong to this class, as they are produced by excess of volition, and may still not improperly be called depraved voluntary actions. See Sect. XXXIV. 1. where many motions in common language termed involuntary are shewn to depend on excess of volition.

When these exertions from excess of volition, which in common language are termed involuntary motions, either of mind or body, are perpetually exerted in weak constitutions, the pulse becomes quick; which is occasioned by the too great expenditure of the sensorial power in these unceasing modes of activity. In the same manner as in very weak people in fevers, the pulse sometimes increases in frequency to 140 strokes in a minute, when the patients stand up or endeavour to walk; and subsides to 110, when they lie down again in their beds. Whence it appears, that when a very quick pulse accompanies convulsion or insanity, it simply indicates the weakness of the patient; that is, that the expenditure of sensorial power is too great for the supply of it. But if the strength of the patient is not previously exhausted, the exertions of the muscles are attended with temporary increase of circulation, the reciprocal swellings and elongations

tions of their bellies push forwards the arterial blood, and promote the absorption of the venous blood; whence a temporary increase of secretion and of heat, and a stronger pulse.

A correspondent acquaints me, that he finds difficulty in understanding how the convulsions of the limbs in epilepsy can be induced by voluntary exertions. This I suspect first to have arisen from the double meaning of the words "involuntary motions;" which are sometimes used for those motions, which are performed without the interference of volition, as the pulsations of the heart and arteries; and at other times for those actions, which occur, where two counter volitions oppose each other, and the stronger prevails; as in endeavouring to suppress laughter, and to stop the shudderings, when exposed to cold. Thus when the poet writes,

—video meliora, proboque,
Deteriora sequor.—

The stronger volition actuates the system, but not without the counteraction of unavailing smaller ones; which constitute deliberation.

¶ A second difficulty may have arisen from the confined use of the words "to will," which in common discourse generally mean to choose after deliberation; and hence our will or volition is supposed to be always in our own power. But the will or voluntary power, acts always from motive, as explained in Sect. XXXIV. 1. and in

Class

CLASs III. 1. 1. 1. OF VOLITION.

Class IV. 1. 3. 2. and III. 2. 1. 12. which motive can frequently be examined previous to action, and balanced against opposite motives, which is called deliberation; at other times the motive is so powerful as immediately to excite the sensorial power of volition into action, without a previous balancing of opposite motives, or counter volitions. The former of these volitions is exercised in the common purposes of life, and the latter in the exertions of epilepsy and insanity.

It is difficult *to think without words*, which however all those must do, who discover new truths by reasoning; and still more difficult, when the words in common use deceive us by their twofold meanings, or by the inaccuracy of the ideas, which they suggest.

S P E C I E S.

1. *Jactitatio*. Restlessness. There is one kind of restlessness attending fevers, which consists in a frequent change of posture to relieve the uneasiness of the pressure of one part of the body upon another, when the sensibility of the system, or of some parts of it, is increased by inflammation, as in the lumbago; which may sometimes be distinguished in its early stage by the incessant desire of the patient to turn himself in bed. But there is another restlessness, which approaches towards writhing or contortions of the body,

body, which is a voluntary effort to relieve pain; and may be esteemed a lighter kind of convolution, not totally unrestrainable by opposite or counteracting volitions.

Thus when a squirrel is confined in a cage, he feels uneasiness from the accumulation of sensorial power, in his muscles, which were before in continual violent exertion in his habits of life; and in this situation finds relief by perpetually jumping about his cage to expend a part of this accumulated sensorial power.

For the same reason those children, who are constrained to sit in some schools for hours together, are liable to acquire habits of moving some muscles of their faces, or hands, or feet, which are called tricks, to exhaust a part of the accumulated sensorial power. Hence restlessness is occasioned by increase of stimulus, or by accumulation of sensorial power.

M. M. A blister. Opium. Warm bath. Bandage on the moving muscles. See Convulsio debilis, Class III. 1. 1. 5. exercise.

2. *Tremor febrilis.* Reciprocal convulsions of the subcutaneous muscles, originating from the pain of the sense of heat, owing to defect of its usual stimulus, and consequent accumulation of sensorial power in it. The actual deficiency of heat may exist in one part of the body, and the pain of cold be felt most vividly in some other part associated with it by sensitive sympathy. So a chillness

chillness down the back is first attended to in ague-fits, though the disease perhaps commences with the torpor and consequent coldness of some internal viscus. But in whatever part of the system the defect of heat exists, or the sensation of it, the convulsions of the subcutaneous muscles exerted to relieve it are very general ; and, if the pain is still greater, a chattering of the teeth is added, the more suddenly to exhaust the sensorial power, and because the teeth are very sensible to cold.

These convulsive motions are nevertheless restrainable by violent voluntary counteraction ; and as their intervals are owing to the pain of cold being for a time relieved by their exertion, they may be compared to laughter, except that there is no interval of pleasure preceding each moment of pain in this as in the latter.

M. M. See I. 2. 2. 1.

3. *Clamor.* Screaming from pain. The talkative animals, as dogs, and swine, and children, scream most, when they are in pain, and even from fear ; as they have used this kind of exertion from their birth most frequently and most forcibly ; and can therefore sooner exhaust the accumulation of sensorial power in the affected muscular or sensual organs by this mode of exertion ; as described in Sect. XXXIV. I. 3. This facility

facility of relieving pain by screaming is the source of laughter, as explained below.

4. *Risus.* The pleasurable sensations, which occasion laughter, are perpetually passing into the bounds of pain; for pleasure and pain are often produced by different degrees of the same stimulus; as warmth, light, aromatic or volatile odours, become painful by their excess; and the tickling on the soles of the feet in children is a painful sensation at the very time it produces laughter. When the pleasurable ideas, which excite us to laugh, pass into pain, we use some exertion, as a scream, to relieve the pain, but soon stop it again, as we are unwilling to lose the pleasure; and thus we repeatedly begin to scream, and stop again alternately. So that in laughing there are three stages, first of pleasure, then pain, then an exertion to relieve that pain. See Sect. XXXIV. I. 3.

Every one has been in a situation, where some ludicrous circumstance has excited him to laugh; and at the same time a sense of decorum has forbid the exertion of these interrupted screams; and then the pain has become so violent, as to occasion him to use some other great action, as biting his tongue, and pinching himself, in lieu of the reiterated screams which constitute laughter.

5. *Convulsio;*

5. *Convulsio.* Convulsion. When the pains from defect or excess of motion are more distressing than those already described, and are not relieved by such partial exertions, as in screaming, or laughter, more general convulsions occur; which vary perhaps according to the situation of the pained part, or to some previous associations formed by the early habits of life. When these convulsive motions bend the body forwards, they are termed emprosthotonoi; when they bend it backward, they are termed opisthotonoi. They frequently succeed each other, but the opisthotonoi are generally more violent; as the muscles, which erect the body, and keep it erect, are naturally in more constant and more forcible action than their antagonists.

The causes of convulsion are very numerous, as from toothing in children, from worms or acidity in their bowels, from eruption of the distinct small-pox, and lastly, from breathing too long the air of an unventilated bed-room. Sir G. Baker, in the Transactions of the College, described this disease, and detected its cause; where many children in an orphan-house were crowded together in one chamber without a chimney, and were almost all of them affected with convulsion; in the hospital at Dublin, many died of convulsions before the real cause was understood. See Dr. Beddoes's Guide to Self-preservation. In a large family, which I attended,

tended, where many female servants slept in one room, which they had contrived to render inaccessible to every blast of air; I saw four who were thus seized with convulsions, and who were believed to have been affected by sympathy from the first who fell ill. They were removed into more airy apartments, but were some weeks before they all regained their perfect health.

Convulsion is distinguished from epilepsy, as the patient does not entirely lose all perception during the paroxysm. Which only shews, that a less exhaustion of sensorial power renders tolerable the pains which cause convulsion, than those which cause epilepsy. The hysterical convulsions are distinguished from those, owing to other causes, by the presence of the expectation of death, which precedes and succeeds them, and generally by a flow of pale urine; these convulsions do not constantly attend the hysterical disease, but are occasionally superinduced by the disagreeable sensation arising from the torpor or inversion of a part of the alimentary canal. Whence the convulsion of laughter is frequently sufficient to restrain these hysterical pains, which accounts for the fits of laughter frequently attendant on this disease.

M. M. To remove the peculiar pain which excites the convulsions. Venefection. An emetic. A cathartic with calomel. Warm bath. Opium in large quantities, beginning with smaller ones.

Mercurial

Mercurial frictions. Electricity. Cold-bath in the paroxysm ; or cold aspersion. See Memoirs of Med. Society, Lon. Vol. III. p. 147. a paper by Dr. Currie.

5. *Convulso debilis.* The convulsions of dying animals, as of those which are bleeding to death in the slaughter-house, are an effort to relieve painful sensation, either of the wound which occasions their death, or of faintness from want of due distention of the blood vessels. Similar to this in a less degree is the subsultus tendinum, or starting of the tendons, in fevers with debility; these actions of the muscles are too weak to move the limb, but the belly of the acting muscles is seen to swell, and the tendon to be stretched. These weak convulsions, as they are occasioned by the disagreeable sensation of faintness from inanition, are symptoms of great general debility, and thence frequently precede the general convulsions of the act of dying. See a case of convulsion of a muscle of the arm, and of the forearm, without moving the bones to which they were attached, Sect. XVII. 1. 8. See twitchings of the face, Class IV. 1. 3. 2.

6. *Convulso dolorifica.* Raphania. Painful convolution. In this disease the muscles of the arms and legs are exerted to relieve the pains left after the rheumatism in young and delicate people; it

VOL. IV.

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recurs

recurs once or twice a day, and has been mistaken for the chorea, or St. Vitus's dance; but differs from it, as the undue motions in that disease only occur, when the patient endeavours to exert the natural ones; are not attended with pain; and cease, when he lies down without trying to move: the chorea, or dance of St. Vitus, is often introduced by the itch, this by the rheumatism.

It has also been improperly called nervous rheumatism; but is distinguished from rheumatism, as the pains recur by periods once or twice a day; whereas in the chronic rheumatism they only occur on moving the affected muscles. And by the warmth of a bed the pains of the chronic rheumatism are increased, as the muscles or membranes then become more sensible to the stimulus of the extraneous mucaginous material deposited under them. Whereas the pains of the raphania, or painful convulsion, commence with coldness of the part, or of the extremities. See Rheumatismus chronicus. Class I. 1. 3. 12.

The pains which accompany the contractions of the muscles in this disease, seem to arise from the too great violence of those contractions, as happens in the cramp of the calf of the leg; from which they differ in those being fixed, and these being reiterated contractions. Thus these convulsions are generally of the lower limbs, and recur at periodical times from some uneasy

uneasy sensation from defect of action, like other periodic diseases; and the convulsions of the limbs relieve the original uneasy painful sensation, and then produce a greater pain from their own too vehement contractions. There is however another way of accounting for these pains, when they succeed the acute rheumatism; and that is by the coagulable lymph, which may be left still unabsorbed on the membranes; and which may be in too small quantity to affect them with pain in common muscular exertions, but may produce great pain, when the bellies of the muscles swell to a larger bulk in violent action.

M. M. Venesection. Calomel. Opium. Bark. One grain of calomel and one of opium for ten successive nights. A bandage spread with emplastrum de minio put tight on the affected part.

7. *Epilepsia* is originally induced, like other convulsions, by a voluntary exertion to relieve some pain. This pain is most frequently about the pit of the stomach, or termination of the bile-duct; and in some cases the torpor of the stomach, which probably occasioned the epileptic fits, remains afterwards, and produces a chronical anorexia; of which a case is related in Class II. 2. 2. 1. There are instances of its beginning in the heel, of which a case is published by Dr. Short, in the Med. Essays, Edinb. I once saw a child about ten years old, who frequently

fell down in convulsions, as she was running about in play ; on examination a wart was found on one ankle, which was ragged and inflamed ; which was directed to be cut off, and the fits never recurred.

When epilepsy first commences, the patients are liable to utter one scream before they fall down ; afterwards the convulsions so immediately follow the pain, which occasions them, that the patient does not recollect or seem sensible of the preceding pain. Thus in laughter, when it is not excessive, a person is not conscious of the pain, which so often recurs, and causes the successive screams or exertions of laughter, which give a temporary relief to it.

Epileptic fits frequently recur in sleep from the increase of sensibility at that time, explained in Sect. XVIII. 14. In two such cases, both of young women, one grain of opium given at night, and continued many months, had success ; in one of them the opium was omitted twice at different times, and the fit recurred on both the nights. In the more violent case, described in Sect. XVIII. 15, opium had no effect.

Epileptic fits generally commence with setting the teeth, by which means the tongue is frequently wounded ; and with rolling the eye-balls in every kind of direction ; for the muscles which suspend the jaw, as well as those which move the eyes, are in perpetual motion during our waking

ing hours; and yet continue subservient to volition; hence their more facile and forcible actions for the purpose of relieving pain by the exhaustion of sensorial power. See Section XXXIV. I. 4.

Epileptic convulsions are not attended with the fear of death, as in the hysterical disease, and the urine is of a straw colour. However it must be noted, that the disagreeable sensations in hysterical diseases sometimes are the cause of true epileptic convulsions, of syncope, and of madness.

The pain, which occasions some fits of epilepsy, is felt for a time in a distant part of the system, as in a toe or heel; and is said by the patient gradually to ascend to the head, before the general convulsions commence. This ascending sensation has been called *aura epileptica*, and is said to have been prevented from affecting the head by a tight bandage round the limb. In this malady the pain, probably of some torpid membrane, or diseased tendon, is at first only so great as to induce slight spasms of the muscular fibres in its vicinity; which slight spasms cease on the numbness introduced by a tight bandage; when no bandage is applied, the pain gradually increases, till general convulsions are exerted to relieve it. The course of a lymphatic, as when poisonous matter is absorbed; or of a nerve, as in the sciatica, may, by the sympathy existing

between their extremities and origins, give an idea of the ascent of an aura or vapour.

In difficult parturition it sometimes happens, that general convulsions are excited to relieve the pain of labour, instead of the exertions of those muscles of the abdomen and diaphragm, which ought to forward the exclusion of the child. See Class III. I. I. That is, instead of the particular muscular actions, which ought to be excited by sensation to remove the offending cause, general convulsions are produced by the power of volition, which still the pain, as in common epilepsy, without removing the cause; and, as the parturition is not thus promoted, the convulsions continue, till the sensorial power is totally exhausted, that is, till death. In patients afflicted with epilepsy from other causes, I have seen the most violent convulsions recur frequently during pregnancy without miscarriage; as they did not tend to forward the exclusion of the fetus.

Pains of this kind have been called false pains by some writers on midwifery, and are directed to be relieved by an opiate, and then they say the true pains will commence. M. Daventer directs the accoucheur to attend to the os tincæ, to distinguish them from each other, which dilates with every true pain, but contracts with every false one, that is, the voluntary actions of other muscles

muscles to relieve pain are attended with those of the os uteri, as mentioned in Genus I. of this Class and Order preceding the descriptions of the Species.

M. M. Venesection. A large dose of opium.
Delivery.

The later in life epileptic fits are first experienced, the more dangerous they may be esteemed in general; as in these cases the cause has generally been acquired by the habits of the patient, or by the decay of some part, and is thus probably in an increasing state. Whereas in children the change in the system, as they advance to puberty, sometimes removes the cause. So in toothing, fits of convulsion with stupor frequently occur, and cease when the tooth advances; but this is not to be expected in advanced life. Sir — —, about sixty years of age, had only three teeth left in his upper jaw, a canine tooth, and one on each side of it. He was seized with epileptic fits, with pain commencing in these teeth. He was urged to have them extracted, which he delayed too long, till the fits were become habitual, and then had them extracted in vain, and in a few months sunk under the disease.

Mr. H. M. was seized with pain in the adductor muscle of the right thumb, and had epileptic convulsions in consequence; these gradually increased in strength and frequency; a bandage on the arm, drawn very tight as soon as the pain

of the ball of the thumb commenced, prevented the epileptic fits, I suppose by lessening the pain by the numbness occasioned by compressing the nerve. I advised the nerves of this muscle to be cut, which was done or attempted, and was supposed for a time to have cured the disease, as I was informed. Afterwards it recurred and destroyed the patient, who might have probably been saved by the loss of a hand, which I should have advised, but was not again consulted.

I have to add, that the tic dououreux, or hemicrania idiopathica, I believe to be a disease of this kind, owing to a torpor of the extremity of some branch of a nerve, and should recommend, when the nerve cannot be bisected, to pass through it for many hours or even days, a current of galvanic electricity from Volta's pillar of zinc, and silver, and cloth moistened with salt and water.

Mr. F____, who had lived intemperately, and had been occasionally affected with the gout, was suddenly seized with epileptic fits; the convulsions were succeeded by apoplectic snoring; from which he was, in about 20 minutes, disturbed by fresh convulsions, and had continued in this situation above four-and-twenty hours. About eight ounces of blood were then taken from him: and after having observed, that the apoplectic torpor continued about 20 minutes, I directed him to be forcibly raised up in bed, after

after he had thus lain about fifteen minutes, to gain an interval between the termination of the sleep, and the renovation of convulsion. In this interval he was induced to swallow forty drops of laudanum. Twenty more were given him in the same manner in about half an hour, both which evidently shortened the convulsion fits, and the consequent stupor; he then took thirty more drops, which for the present removed the fits. He became rather insane the next day, and after about three more days lost the insanity, and recovered his usual state of health.

The case mentioned in Sect. XXVII. 2. where the patient was left after epileptic fits with a suffusion of blood beneath the tunica adjunctiva of the eye, was in almost every respect similar to the preceding, and submitted to the same treatment. Both of them suffered frequent relapses, which were relieved by the same means, and at length perished, I believe, by the epileptic fits.

In those patients, who have not been subject to epilepsy before they have arrived to about forty years of age, and who have been intemperate in respect to spirituous potation, I have been induced to believe, that the fits were occasioned by the pain of a diseased liver; and this became more probable in one of the above subjects, who had used means to repel eruptions on the face; and thus by some stimulant application had prevented an inflammation taking

place on the skin of the face instead of on some part of the liver. Secondly, as in these cases insanity had repeatedly occurred, which could not be traced from an hereditary source; there is reason to believe, that this as well as the epileptic convulsions were caused by spirituous potion; and that this therefore is the original source both of epilepsy and of insanity in those families, which are afflicted with them. This idea however brings some consolation with it; as it may be inferred, that in a few sober generations these diseases may be eradicated, which otherwise destroy the family.

M. M. Venefection. Opium. Bark. Steel. Arsenic. Opium one grain twice a day for years together. See the preceding article, and the succeeding one.

Anorexia epileptica, as mentioned in Class II. 2. 2. 1. is a dreadful disease, originating, I believe, from a paralysis of the stomach, and generally occasioned by the application of great external cold to the skin. A young lady, whom I saw yesterday, who had long experienced a weak state of health, went to church on an uncommonly cold Sunday, when the thermometer was said to stand below 20 during the whole day. She became immediately indisposed, and was seized in a day or two with tremors and convulsions in her sleep; and which returned every two or three days. Her extremities are now always uncommonly cold,

cold, and her appetite to food totally defective. She took three drops of a saturated solution of arsenic and a bitter draught twice a day for a fortnight, and gradually recovered her former state of health.

Another young lady, whom I lately saw, began to start somewhat like a violent hiccough many times in an hour, after using a very cold shower-bath repeatedly. This had continued daily at uncertain times for many months, and received temporary advantage from one drop of oil of cinnamon, three or four times a day, on powdered sugar; this case belongs to convulsion rather than epilepsy, but was attended, like the former, with great defect of appetite. In both these cases I suspect, that the great torpor of the stomach was caused by too violent or too long continued coldness applied to the skin; whence the sensorial power of association, which ought to have been excited by the action of the cutaneous vessels, and to have then contributed to the action of the stomach, did not exist; and that the stomach in consequence became torpid. See Suppl. I. 14. 3. and Art. IV. 2. 6. 8. and Class III. 2. 1. 17.

Dr. Wilson, of Spalding, has lately much recommended the argentum nitratum in epilepsy; he gives two grains and a half three times a day, mixed with bread crumbs into pills, as he asserts, with

with the happiest success. Annals of Medicine, 1797.

8. *Epilepsia dolorifica.* Painful epilepsy. In the common epilepsy the convulsions are immediately induced, as soon as the disagreeable sensation, which causes them, commences; but in this the pain continues long with cold extremities, gradually increasing for two or three hours, till at length convulsions or madness come on; which terminate the daily paroxysm, and cease themselves in a little time afterwards.

This disease sometimes originates from a pain about the lower edge of the liver, sometimes in the temple, and sometimes in the pudendum; it recurs daily for five or six weeks, and then ceases for several months. The pain is owing to defect of action, that is, to the accumulation of sensorial power in the part, which probably sympathizes with some other part, as explained in Sect. XXXV. 2. XII. 5. 3. and Class II. 1. 1. 11. and IV. 2. 2. 3.

It is the most painful malady that human nature is liable to!—See Sect. XXXIV. 1. 4.

Mrs. C—— was seized every day about the same hour with violent pain on the right side of her bowels about the situation of the lower edge of the liver, without fever, which increased for an hour or two, till it became totally intolerable.

After

After violent screaming she fell into convulsions, which terminated sometimes in fainting, with or without stertor, as in common epilepsy; at other times a temporary insanity supervened; which continued about half an hour, and the fit ceased. These paroxysms had returned daily for two or three weeks, and were at length removed by large doses of opium, like the fits of reverie or somnambulation. About half an hour before the expected return of the fit three or four grains of opium were exhibited, and then tincture of opium was given in warm brandy and water about twenty or thirty drops every half hour, till the eyes became somewhat inflamed, and the nose began to itch, and by the sharp movements of the patient, or quick speech, an evident intoxication appeared; and then it generally happened that the pain ceased. But the effects of this large dose of opium was succeeded by perpetual sickness and efforts to vomit, with great general debility all the succeeding day.

The rationale of this temporary cure from the exhibition of opium and vinous spirit depends on the great expenditure of sensorial power in the increased actions of all the irritative motions, by the stimulus of such large quantities of opium and vinous spirit; together with the production of much sensation, and many movements of the organs of sense or ideas in consequence of that sensation; and lastly, even the motions of the arterial

arterial system become accelerated by this degree of intoxication, all which soon exhausted so much sensorial power as to relieve the pain; which would otherwise have caused convulsions or insanity, which are other means of expending sensorial power. The general debility on the succeeding day, and the particular debility of the stomach, attended in consequence with sickness and frequent efforts to vomit, were occasioned by the system having previously been so strongly stimulated, and those parts in particular on which the opium and wine more immediately acted. This sickness continued so many hours as to break the catenation of motions, which had daily reproduced the paroxysm; and thus it generally happened, that the whole disease ceased for some weeks or months from one great intoxication, a circumstance not easily to be explained on any other theory.

The excess or defect of motion in any part of the system occasions the production of pain in that part, as in Sect. XII. 1. 6. This defect or excess of fibrous action is generally induced by excess or defect of the stimulus of objects external to the moving organ. But there is another source of excessive fibrous action, and consequent pain, which is from excess of volition, which is liable to effect those muscles, that have weak antagonists; as those which support the under jaw, and close the mouth in biting, and those of the calf

calf of the leg; which are thus liable to fixed or painful contractions, as in trismus, or locked jaw, and in the cramp of the calf of the leg; and perhaps in some colics, as in that of Japan: these pains, from contraction arising from excess of volition in the part from the want of the counteraction of antagonist muscles, may give occasional cause to epileptic fits, and may be relieved in the same way, either by exciting irritative and sensitive motions by the stimulus of opium and wine; or by convulsions or insanity, as described above, which are only different methods of exhausting the general quantity of sensorial power.

Considering the great resemblance between this kind of painful epilepsy and the colic of Japan, as described by Kæmpfer; and that that disease was said to be cured by acupuncture, or the prick of a needle; I directed some very thin steel needles to be made about three inches long, and of such a temper, that they would bend double rather than break; and wrapped wax thread over about half an inch of the blunt end for a handle. One of these needles, when the pain occurred, was pushed about an inch into the painful part, and the pain instantly ceased; but I was not certain, whether the fear of the patient, or the stimulus of the puncture, occasioned the cessation of pain; and as the paroxysm had continued some weeks, and was then declining, the experiment was not tried again. The disease is said to be very frequent

quent in Japan, and its seat to be in the bowels, and that the acupuncture eliminates the air, which is supposed to distend the bowel. But though the aperture thus made is too small to admit of the eduction of air; yet as the stimulus of so small a puncture may either excite a torpid part into action, or cause a spasmodic one to cease to act; and lastly, as no injury could be likely to ensue from so small a perforation; I should be inclined at some future time to give this a fairer trial in similar circumstances.

Another thing worth trial at the commencement of this deplorable disease would be electricity, by passing strong shocks through the painful part; which, whether the pain was owing to the inaction of that part, or of some other membrane associated with it, might stimulate them into exertion; or into inactivity, if owing to fixed painful contraction.

And lastly, the cold bath, or aspersions with cold water on the affected part, according to the method of Dr. Currie in the Memoirs of a Med. Soc. London, Vol. III. p. 147, might produce great effect at the commencement of the pain. Nevertheless opium duly administered, so as to precede the expected paroxysm, and in such doses, given by degrees, as to induce intoxication, is principally to be depended upon in this deplorable malady. To which should be added, that if venefection can be previously performed, even to but

but few ounces, the effect of the opium is much more certain; and still more so, if there be time to premise a brisk cathartic, or even an emetic. The effect of increased stimulus is so much greater after previous defect of stimulus; and this is still of greater advantage, where the cause of the disease happens to consist in a material, which can be absorbed. See Art. IV. 2. 8.

M. M. Venesection. An emetic. A cathartic. Warm bath. Opium a grain every half hour. Wine. Spirit of wine. If the patient becomes intoxicated by the above means, the fit ceases, and violent vomitings and debility succeed on the subsequent day, and prevent a return. Blisters or sinapisms on the small of the leg, taken off when they give much pain, are of use in slighter convulsions. Acupuncture. Electricity. Aspersion with cold water on the painful part. A bag of snow or ice applied on the pained part.

9. *Somnambulismus.* Sleep-walking is a part of reverie, or studium inane, described in Sect. XIX. In this malady the patients have only the general appearance of being asleep in respect to their inattention to the stimulus of external objects, but, like the epilepsies above described, it consists in voluntary exertions to relieve pain. The muscles are subservient to the will, as appears by the patient's walking about, and sometimes doing the common offices of life. The ideas of the

mind also are obedient to the will, because the patient's discourse is consistent, though he answers imaginary questions. The irritative ideas of external objects continue in this malady, because the patients do not run against the furniture of the room; and when they apply their volition to their organs of sense, they become sensible of the objects they attend to, but not otherwise, as general sensation is destroyed by the violence of their voluntary exertions. At the same time the sensations of pleasure in consequence of ideas excited by volition are vividly experienced, and other ideas seem to be excited by these pleasurable sensations, as appears in the case of Master A. Sect. XXXIV. 3. 1. where a history of a hunting scene was voluntarily recalled, with all the pleasurable ideas which attended it. In melancholy madness the patient is employed in voluntarily exciting one idea, with those which are connected with it by voluntary associations only, but not so violently as to exclude the stimuli of external objects. In reverie variety of ideas are occasionally excited by volition, and those which are connected with them either by sensitive or voluntary associations, and that so violently as to exclude the stimuli of external objects. These two situations of our sensual motions, or ideas, resemble convulsion and epilepsy; as in the former the stimulus of external objects is still perceived, but not in the latter.

Whence this disease, so far from being connected with sleep, though it has by universal mistake acquired its name from it, arises from excess of volition, and not from a suspension of it; and though, like other kinds of epilepsy, it often attacks the patients in their sleep, yet those two, whom I saw, were more frequently seized with it while awake, the sleep-walking being a part of the reverie. See Sect. XIX. and XXXIV. 3. and Class II. I. 7. 4. and III. I. 2. 18.

M. M. Opium in large doses before the expected paroxysm.

10. *Asthma convulsivum.* The fits of convulsive asthma return at periods, and are attended with cold extremities, and so far resemble the access of an intermittent fever; but, as the lungs are not sensible to the pain of cold, a shivering does not succeed, but instead of it violent efforts of respiration; which have no tendency, as in the humoral asthma, to dislodge any offending material, but only to relieve the pain by exertion, like the shuddering in the beginning of ague-fits, as explained Class III. I. 1. 2.

The insensibility of the lungs to cold is observable on going into frosty air from a warm room; the hands and face become painfully cold, but no such sensation is excited in the lungs; which is another argument in favour of the existence of a peculiar set of nerves for the pur-

pose of perceiving the universal fluid matter of heat, in which all things are immersed. See Sect. XIV. 6. Yet are the lungs nevertheless very sensible to the deficiency of oxygen in the atmosphere, as all people experience, when they go into a room crowded with company and candles, and complain, that it is so close, they can scarcely breathe ; and the same in some hot days in summer.

There are two diseases, which bear the name of asthma. The first is the torpor or inability of the minute vessels of the lungs, consisting of the terminations of the pulmonary and bronchial arteries and veins, and their attendant lymphatics ; in this circumstance it resembles the difficulty of breathing, which attends cold bathing. If this continues long, a congestion of fluid in the air-cells succeeds, as the absorbent actions cease completely before the secerning ones ; as explained in Class I. 1. 2. 3. And the coldness, which attends the inaction of these vessels, prevents the usual quantity of exhalation. Some fits cease before this congestion takes place, and in them no violent sweating nor any expusion of phlegm occurs. This is the humoral asthma, described at Class II. 1. 1. 7.

The second kind of asthma consists in the convulsive actions in consequence of the disagreeable sensations thus induced ; which in some fits of asthma are very great, as appears in the

the violent efforts to raise the ribs, and to depress the diaphragm, by lifting the shoulders. These, so long as they contribute to remove the cause of the disease, are not properly convulsions, but exertions immediately caused by sensation; but in this kind of asthma they are only efforts to relieve pain, and are frequently preceded by other epileptic convulsions.

These two kinds of asthma have so many resembling features, and are so frequently intermixed, that it often requires great attention to distinguish them; but as one of them is allied to anasarca, and the other to epilepsy, we shall acquire a clearer idea of them by comparing them with those disorders. A criterion of the humoral or hydropic asthma is, that it is relieved by copious sweats about the head and breast, which are to be ascribed to the sensitive exertions of the pulmonary vessels to relieve the pain occasioned by the anasarcaous congestion in the air-cells; and which is effected by the increased absorption of the mucus, and its elimination by the retrograde action of those lymphatics of the skin, the branches of which communicate with the pulmonary ones; and which partial sweats do not easily admit of any other explanation. See Class I. 3. 2. 8. Another criterion of it is, that it is generally attended with swelled legs, or other symptoms of anasarca. A criterion of the convulsive asthma may be had from the absence of these cold clammy

D 3

sweats

sweats of the upper part of the body only, and from the patient having occasionally been subject to convulsions of the limbs, as in the common epilepsy.

It may thus frequently happen, that in the humoral asthma some exertions of the lungs may occur, which may not contribute to discharge the anasarcous lymph, but may be efforts simply to relieve pain; besides those efforts, which produce the increased absorption and elimination of it; and thus we have a bodily disease resembling in this circumstance the reverie, in which both sensitive and voluntary motions are at the same time, or in succession, excited for the purpose of relieving pain.

It may likewise sometimes happen, that the disagreeable sensation, occasioned by the congestion of lymph in the air-cells in the humoral or hydroptic asthma, may induce voluntary convulsions of the respiratory organs only to relieve the pain, without any sensitive actions of the pulmonary absorbents to absorb and eliminate the congestion of serous fluid; and thus the same cause may occasionally induce either the humoral or convulsive asthma.

The humoral asthma has but one remote cause, which is the torpor of the pulmonary vessels, like that which occurs on going into the cold bath; or the want of absorption of the pulmonary lymphatics to take up the lymph effused into

into the air-cells. Whereas the convulsive asthma, like other convulsions, or epilepsies, may be occasioned by pain in almost any remote part of the system. But in some of the adult patients in this disease, as in many epilepsies, I have suspected the remote cause to be a pain of the liver, or of the biliary ducts.

The asthmas, which have been induced in consequence of the recess of eruptions, especially of the lepros kind, countenance this opinion. One lady I knew, who for many years laboured under an asthma, which ceased on her being afflicted with pain, swelling, and distortion of some of her large joints, which were esteemed gouty, but perhaps erroneously. And a young man, whom I saw yesterday, was seized with asthma on the retrocession, or ceasing of eruptions on his face.

The convulsive asthma, as well as the hydropic, is more liable to return in hot weather; which may be occasioned by the less quantity of oxygen existing in a given quantity of warm air, than of cold, which can be taken into the lungs at one inspiration. They are both most liable to occur after the first sleep, which is therefore a general criterion of asthma. The cause of this is explained in Sect. XVIII. 15. and applies to both of them, as our sensibility to internal uneasy sensation increases during sleep.

When children are gaining teeth, long before they appear, the pain of the gums often induces

D 4 convulsions.

convulsions. This pain is relieved in some by sobbing and screaming ; but in others a laborious respiration is exerted to relieve the pain ; and this constitutes the true asthma convulsivum. In other children again general convulsions, or epileptic paroxysms, are induced for this purpose ; which, like other epilepsies, become established by habit, and recur before the irritation has time to produce the painful sensation, which originally caused them.

The asthma convulsivum is also sometimes induced by worms, or by acidity in the stomachs of children, and by other painful sensations in adults ; in whom it is generally called nervous asthma, and is often joined with other epileptic symptoms.

This asthma is distinguished from the peripneumony, and from the croup, by the presence of fever in the two latter. It is distinguished from the humoral asthma, as in that the patients are more liable to run to the cold air for relief, are more subject to cold extremities, and experience the returns of it more frequently after their first sleep. It is distinguished from the hydrops thoracis, as that has no intervals, and the patient sits constantly upright, and the breath is colder ; and, where the pericardium is affected, the pulse is quick and unequal. See Hydrops Thoracis, I.

2. 3. 14.

M. M. Venesection once. A cathartic with calomel

calomel once. Opium. Asafatida. Warm bath. If the cause can be detected, as in toothing or worms, it should be removed. As this species of asthma is so liable to recur during sleep, like epileptic fits, as mentioned in Section XVIII. 15. there was reason to believe, that the respiration of an atmosphere mixed with hydrogen, or any other innocuous air, which might dilute the oxygen, would be useful in preventing the paroxysms by decreasing the sensibility of the system. This, I am informed by Dr. Beddoes, has been used with decided success by Dr. Ferriar. See Class II.

1. I. 7.

11. *Asthma dolorificum.* Angina pectoris. The painful asthma was first described by Dr. Heberden in the Transactions of the College; its principal symptoms consist in a pain about the middle of the sternum, or rather lower, on every increase of pulmonary or muscular exertion, as in walking faster than usual, or going quick up a hill, or even up stairs; with great difficulty of breathing, so as to occasion the patient instantly to stop. A pain in the arms about the insertion of the tendon of the pectoral muscle generally attends, and a desire of resting by hanging on a door or branch of a tree by the arms is sometimes observed. Which is explained in Class I. 2. 3. 14. and in Sect. XXIX. 5. 2.

These patients generally die suddenly; and on examining the thorax no certain cause, or seat, of the

the disease has been detected; some have supposed the valves of the arteries, or of the heart, were imperfect; and others that the accumulation of fat about this viscus or the lungs obstructed their due action; but other observations do not accord with these suppositions.

Mr. W—, an elderly gentleman, was seized with asthma during the hot part of last summer; he always waked from his first sleep with difficult respiration, and pain in the middle of his sternum, and after about an hour was enabled to sleep again. As this had returned for about a fortnight, it appeared to me to be an asthma complicated with the disease, which Dr. Heberden has called *angina pectoris*. It was treated by venesection, a cathartic, and then by a grain of opium given at going to bed, with ether and tincture of opium when the pain or asthma recurred, and lastly with the bark, but was several days before it was perfectly subdued.

This led me to conceive, that in this painful asthma the diaphragm, as well as the other muscles of respiration, was thrown into convulsive action, and that the fibres of this muscle not having proper antagonists, a painful fixed spasm of it, like that of the muscles in the calf of the leg in the cramp, might be the cause of death in the *angina pectoris*, which I have thence arranged under the name of painful asthma, and leave for further investigation.

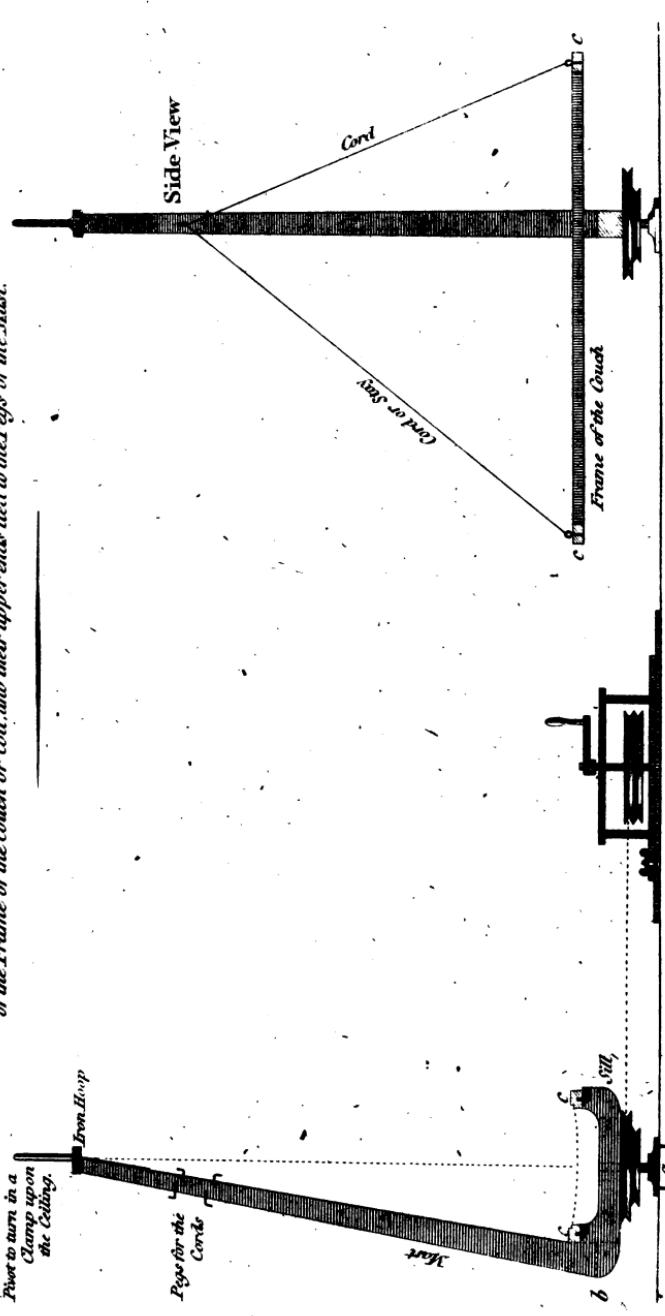
From the history of the case of the late much lamented

A MOVABLE ROTATIVE COUCH which may be put out of the way when not in use.

The length of the Mast must be suited to the height of the Ceiling.—The angle at *b* must be secured by a Plate of Iron screwed on the outside.—

The cast Iron Cap (*a*) for the bottom Pivot may have three spikes to fix it to the Floor.—The whole of the Wood-work may be made of Oak or Elm.—The frame of the Couch (*c c*) is not fixed to the Sill, but the latter has two projecting from Pegs, which go into holes in the Frame, so

that the centre of motion may be changed at pleasure.—When not in use, the Frame may be lifted off the Sill, and set up parallel to the Mast, in a corner of the room.—There are four cords or Sings, one fastened to each corner of the Frame of the couch or Cot, and their upper ends tied to the Pegs of the Mast.



This Plate with the explanation were sent me by the great Engineer Mr. James Watt.

lamented John Hunter, and from the appearances after death, the case seems to have been of this kind, complicated with vertigo and consequent affection of the stomach. The remote cause seems to have arisen from ossifications of the coronary arteries; and the immediate cause of his death from fixed spasm of the heart. Other histories and dissections are still required to put this matter out of doubt; as it is possible, that either a fixed spasm of the diaphragm, or of the heart, which are both furnished with but weak antagonists, may occasion sudden death; and these may constitute two distinct diseases.

Four patients I have now in my recollection, all of whom I believed to labour under the angina pectoris in a great degree; which have all recovered, and have continued well three or four years by the use, as I believe, of issues on the inside of each thigh; which were at first large enough to contain two pease each, and afterwards but one. They took besides some slight antimonial medicine for a while, and were reduced to half the quantity or strength of their usual potation of fermented liquor.

The use of femoral issues in angina pectoris was first recommended by Dr. Macbride, physician at Dublin, Med. Observ. and Enquir. Vol. VI. And I was further induced to make trial of them, not only because the means which I had before used were inadequate, but from the ill effect

effect I once observed upon the lungs, which succeeded the cure of a small sore beneath the knee; and argued conversely, that issues in the lower limbs might assist a difficult respiration.

Mrs. L——, about fifty, had a small sore place, about the size of half a pea on the inside of the leg a little below the knee. It had discharged a pellucid fluid, which she called a ley-water, daily for fourteen years, with a great deal of pain; on which account she applied to a surgeon, who, by means of bandage and a saturnine application, soon healed the sore, unheedful of the consequences. In less than two months after this I saw her with great difficulty of breathing, which with universal anasarca soon destroyed her.

The theory of the double effect of issues, as above related, one in relieving by their presence the asthma dolorificum, and the other in producing by its cure an anasarca of the lungs, is not easy to explain. Some similar effects from cutaneous eruptions and from blisters are mentioned in Class I. 1. 2. 9. In these cases it seems probable, that the pain occasioned by issues, and perhaps the absorption, of a small quantity of aerated purulent matter, stimulate the whole system into greater energy of action, and thus prevent the torpor which is the beginning of so many diseases. In confirmation of this effect of pain on the system, I remember the case of a lady of an ingenious and active mind, who, for many of the latter years of her life, was perpetually

tually subject to great pains of her head from decaying teeth. When all her teeth were gone, she became quite low spirited, and melancholy in the popular sense of that word, and after a year or two became universally dropsical and died.

M. M. Issues in the thighs. Five grains of rhubarb, and one sixth of a grain of emetic tartar every night for some months, with or without half a grain of opium. No stronger liquor than small beer, or wine diluted with twice its quantity of water. Since I wrote the above I have seen two cases of hydrops thoracis, attended with pain in the left arm, so as to be mistaken for asthma dolorificum, in which femoral issues, though applied early in the disease, had no effect.

12. *Stridor dentium.* The clattering of the teeth on going into cold water, or in the beginning of ague-fits, is an exertion along with the tremblings of the skin to relieve the pain of cold. The teeth and skin being more sensible to cold than the more internal parts, and more exposed to it, is the reason that the muscles, which serve them, are thrown into exertion from the pain of cold rather than those of respiration, as in screaming from more acute pain. Thus the poet,

Put but your toes into cold water,
Your correspondent teeth will clatter.

PRIOR.

In

In more acute pains the jaws are gnashed together with great vehemence, insomuch that sometimes the teeth are said to have been broken by the force. See Sect. XXXIV. 1. 3. In these cases something should be offered to the patient to bite, as a towel, otherwise they are liable to tear their own arms, or to bite their attendants, as I have witnessed in the painful epilepsy.

13. *Tetanus trismus.* Cramp. The tetanus consists of a fixed spasm of almost all the muscles of the body; but the trismus, or locked jaw, is the most frequent disease of this kind. It is generally believed to arise from sympathy with an injured tendon. In one case where it occurred in consequence of a broken ankle from a fall from a horse, it was preceded by evident hydrophobia. Amputation was advised, but not submitted to; two wounds were laid into one with scissors, but the patient died about the seventh day from the accident. In this case the wounded tendon, like the wounds from the bite of a mad dog, did not produce the hydrophobia; and then the locked jaw, till several days after the accident.

I twice witnessed the locked jaw from a pain beneath the sternum, about the part where it is complained of in painful asthma, or angina pectoris, in the same lady at some years distance of time. The last time it had continued two days, and she wrote her mind, or expressed herself by signs:

signs. On observing a broken tooth, which made a small aperture into her mouth, I rolled up five grains of opium like a worm about an inch long, and introducing it over the broken tooth, pushed it onward by means of a small crow-quill; as it dissolved I observed she swallowed her saliva, and in less than half an hour she opened her mouth and conversed as usual.

Men are taught to be ashamed of screaming from pain in their early years; hence they are prone to exert the muscles of the jaws instead, which they have learnt to exert frequently and violently from their infancy; whence the locked jaw. This and the following spasm have no alternative relaxations, like the preceding ones; which is perhaps owing, first, to the weakness of their antagonist muscles, those which elevate the jaw being very strong for the purpose of biting and masticating hard substances, and for supporting the under jaw, with very weak antagonist muscles; and secondly, to their not giving sufficient relief even for a moment to the pain, or its preceding irritation, which excited them.

M. M. Opium in very large quantities. Mercurial ointment used extensively. Electricity. Cold bath. Dilate the wound, and fill it with lint moistened with spirit of turpentine; which inflames the wound, and cures or prevents the convulsions. See a case, *Transact. of American Society*, Vol. II. p. 227.

Wine

Wine in large quantities in one case was more successful than opium; it probably inflames more, which in this disease is desirable. Between two or three ounces of bark, and from a quart to three pints of wine a day, succeeded better than opium. Ib.

14. *Tetanus dolorificus.* Painful cramp. This kind of spasm most frequently attacks the calf of the leg, or muscles of the toes; it often precedes paroxysms of gout, and appears towards the end of violent diarrhoea, and from indigestion, or from acid diet. In these cases it seems to sympathize with the bowels, but is also frequently produced by the pain of external cold, and by the too great previous extension of the muscles, whence some people get the cramp in the extensor muscles of the toes after walking down hill, and of those of the calf of the leg after walking up a steep eminence. For the reason why these cramps commence in sleep, see Sect. XVIII. 15.

The muscle in this disease contracts itself to relieve some smaller pain, either from irritation or association, and then falls into great pain itself, from the too great action of its own fibres. Hence any muscle, by being too vehemently exerted, falls into cramp, as in swimming too forcibly in water, which is painfully cold; and a secondary pain is then induced by the too violent

violent contraction of the muscle; though the pain, which was the cause of the contraction, ceases. Which accounts for the continuance of the contraction, and distinguishes this disease from other convulsions, which are relaxed and exerted alternately. Hence whatever may be the cause of the primary pain, which occasions the cramp of the calf of the leg, the secondary one is relieved by standing up, and thus by the weight of the body on the toes forcibly extending the contracted muscles. For the cause, which induces these muscles of the calf of the leg to fall into more violent contraction than other spasmodic muscles, proceeds from the weakness of their antagonist muscles; as they are generally extended again after action by the weight of the body on the balls of the toes. See the preceding article.

M. M. Rub the legs with camphor dissolved in oil, and let the patient wear stockings in bed. If a foot-board be put at the bed's feet, and the bed be so inclined, that he will rest a little with his toes against the foot-board, that pressure is said to prevent the undue contractions of the musculi gastrocnemii, which constitute the calf of the leg. In gouty patients, or where the bowels are affected with acidity, half a grain of opium, and six grains of rhubarb, and six of chalk, every night. Flesh-meat for supper. A little very weak warm spirit and water may be

taken for present relief, when these cramps are very troublesome to weak or gouty patients.

15. *Hydrophobia.* Dread of water generally attending canine madness. I was witness to a case, where this disease preceded the locked jaw from a wound in the ankle, occasioned by a fall from a horse; as mentioned in the preceding article. It came on about the sixth day after the accident; when the patient attempted to swallow fluids, he became convulsed all over from the pain of this attempt, and spurted them out of his mouth with violence. It is also said to happen in some hysterical cases. Hence it seems rather the immediate consequence of a pained tendon, than of a contagious poison. And is so far analogous to tetanus, according with the opinions of Dr. Rush and Dr. Percival.

In other respects, as it is produced by the saliva of an enraged animal instilled into a wound, it would seem analogous to the poison of venomous animals. And from the manner of its access so long after the bite, and of its termination in a short time, it would seem to resemble the progress of contagious fevers. See Sect. XXII. 3. 3.

If the patient was bitten in a part, which could be totally cut away, as a finger, even after the hydrophobia appears, it is probable it might cure it; as I suspect the cause still remains

mains in the wounded tendon, and not in a diffused infection tainting the blood. Hence there are generally uneasy sensations, as cold or numbness, in the old cicatrix, before the hydrophobia commences. See a case in Medical Communications, Vol. II. p. 190.

If the diseased tendon could be inflamed without cutting it out, as by cupping, or caustic, or blister after cupping, and this in the old wound long since healed, after the hydrophobia commences, it might prevent the spasms about the throat. As inflaming the teeth by the use of mercury is of use in some kinds of hemicrania. Put spirit of turpentine on the wound, wash it well. See Class I. 3. 1. 11. IV. 1. 2. 7.

M. M. Wine, musk, oil, internally. Opium, mercurial ointment, used extensively. Mercurial fumigation. Turpeth mineral. To salivate the patient as soon as possible. Excision or a caustic on the scar, even after the appearance of hydrophobia. Put a tight bandage on the limb above the scar of the old wound to benumb the pained tendon, however long the wound may have been healed. Could a hollow catheter of elastic gum, caoutchouc, be introduced into the œsophagus by the mouth or nostril, and liquid nourishment be thus conveyed into the stomach? See Default's Journal; Case I. where in an ulcer of the mouth, such a catheter was introduced by the nostril, and kept in the œsophagus

E 2. phagus

phagus for a month, by which means the patient was nourished and preserved.

It is recommended by Dr. Bardsley to give oil internally by a similar method contrived by Mr. John Hunter. He covered a probang with the skin of a small eel, or the gut of a lamb or cat. It was tied up at one end above and below the sponge, and a slit made above the upper ligature; to the other end of the eel-skin or gut was fixed a bladder and pipe. The probang thus covered was introduced into the stomach, and the liquid food or medicine was put into the bladder and squeezed down through the eel-skin. Mem. of Society at Manchester. See Class I. 2. 3. 25.

Dr. Bardsley has endeavoured to prove, that dogs never experience the hydrophobia, or canine madness, without having been previously bitten or infected; and secondly, that the disease in this species of animal always shews itself in five or six weeks; and concludes from hence, that this dreadful malady might be annihilated by making all the dogs in Great Britain perform a kind of quarantine, by shutting them up for a certain number of weeks. Though the disease from the bite of the mad dog is perhaps more analogous to those from the wounds inflicted by venomous animals than to those from other contagious matter, yet these observations are well worthy further attention; which the author promises.

In

In Dr. Hamilton's elaborate treatise on hydrophobia, Longman, London, it is proposed to try the effect of arsenic in this disease, which is said to be the principal ingredient of the Tanjore pill, which is said to cure those who are diseased by the bite of serpents, and to cure the hydrophobia.

A solution of sublimate of mercury in rectified spirits is also worthy a trial, as mentioned in Class I. 3. 1. 11.

ORDO I.

Increased Volition.

GENUS II.

With increased Actions of the Organs of Sense.

IN every species of madness there is a peculiar idea either of desire or aversion, which is perpetually excited in the mind with all its connections. In some constitutions this is connected with pleasurable ideas without the exertion of much muscular action, in others it produces violent muscular action to gain or avoid the object of it, in others it is attended with despair and inaction. Mania is the general word for the two former of these, and melancholia for the latter; but the species of them are as numerous as the desires and aversions of mankind.

In the present age the pleasurable insanities are most frequently induced by superstitious hopes of Heaven, by sentimental love, and by personal vanity. The furious insanities by pride, anger, revenge, suspicion. And the melancholy ones by fear of poverty, fear of death, and fear of Hell; with innumerable others.

Quicquid agunt homines, votum, timor, ira, voluptas,
Gaudia, discursus, nostri est farrago libelli.

JUVEN. I. 85.
This

This idea, however, which induces madness or melancholy, is generally untrue; that is, the object is a mistaken fact. As when a patient is persuaded he has the itch, or venereal disease, of which he has no symptom, and becomes mad from the pain this idea occasions. So that the object of madness is generally a delirious idea, and thence cannot be conquered by reason; because it continues to be excited by painful sensation, which is a stronger stimulus than volition. Most frequently pain of body is the cause of convulsion, which is often however exchanged for madness; and a painful delirious idea is most frequently the cause of madness originally, but sometimes of convulsion. Thus I have seen a young lady become convulsed from a fright, and die in a few days; and a temporary madness frequently terminates the paroxysms of the epilepsia dolorifica, and an insanity of greater permanence is frequently induced by the pains or bruises of parturition.

Where the patient is debilitated a quick pulse sometimes attends insane people, which is nevertheless generally only a symptom of the debility owing to the too great expenditure of sensorial power; or of the paucity of its production, as in irritative, or in sensitive inirritated fever. See Class III. 1. 1.

But nevertheless where the quick pulse is permanent, it shews the presence of fever; and as the madness then generally arises from the disagree-

able sensations attending the fever, it is so far a good symptom; because when the fever is cured, or ceases spontaneously, the insanity most frequently vanishes at the same time.

The stimulus of so much volition supports insane people under variety of hardships, and contributes to the cure of diseases from debility, as sometimes occurs towards the end of fevers. See Sect. XXXIV. 2. 5. And, on the same account, they bear large doses of medicines to procure any operation on them; as emetics, and cathartics, which, before they produce their effect in inverting the motions of the stomach in vomiting, or of the absorbents of the bowels in purging, must first weaken the natural actions of those organs, as shewn in Sect. XXXV. 1. 13.

From these considerations it appears, that the indications of cure must consist in removing the cause of the pain, whether it arises from a delirious idea, or from a real fact, or from bodily disease; or secondly, if this cannot be done, by relieving the pain in consequence of such idea or disease. The first is sometimes effected by presenting frequently in a day contrary ideas to shew the fallacy, or the too great estimation, of the painful ideas. 2dly. By change of place, and thus presenting the stimulus of new objects, as a long journey. 3dly. By producing forgetfulness of the idea or object, which causes their pain; by removing all things which recal it to their minds;

minds; and avoiding all conversation on similar subjects. For I suppose no disease of the mind is so perfectly cured by other means as by forgetfulness.

Secondly, the pain in consequence of the ideas or bodily diseases above described is to be removed, first, by evacuations, as venesection, emetics, and cathartics; and then by large doses of opium, or by the vertigo occasioned by a circulating swing, or by a sea-voyage, which, as they affect the organs of sense as well as evacuate the stomach, may contribute to answer both indications of cure.

Where maniacs are outrageous, there can be no doubt but coercion is necessary; which may bed one by means of a strait waistcoat; which disarms them without hurting them; and by tying a handkerchief round their ankles to prevent their escape. In others there can be no doubt, but that confinement retards rather than promotes their cure; which is forwarded by change of ideas in consequence of change of place and of objects, as by travelling or failing.

The circumstances which render confinement necessary, are first, if the lunatic is liable to injure others, which must be judged of by the outrage he has already committed. 2dly. If he is likely to injure himself; this also must be judged of by the despondency of his mind, if such exists. 3dly. If he cannot take care of his affairs.

fairs. Where none of these circumstances exist, there should be no confinement. For though the mistaken idea continues to exist, yet if no actions are produced in consequence of it, the patient cannot be called insane. He can only be termed delirious. If every one, who possesses mistaken ideas, or who puts false estimates on things, was liable to confinement, I know not who of my readers might not tremble at the sight of a madhouse!

The most convenient distribution of insanities will be into general, as mania mutabilis, studium inane, and vigilia; and into partial insanities. These last again may be subdivided into desires and aversions, many of which are succeeded by pleasurable or painful ideas, by fury or dejection, according to the degree or violence of their exertions. Hence the analogy between the insanities of the mind, and the convulsions of the muscles described in the preceding genus, is curiously exact. The convulsions without stupor, are either just sufficient to obliterate the pain, which occasions them; or are succeeded by greater pain, as in the convulsio dolorifica. So the exertions in the mania mutabilis are either just sufficient to allay the pain which occasions them, and the patient dwells comparatively in a quiet state; or those exertions excite painful ideas, which are succeeded by furious discourses, or outrageous actions. The studium inane, or reverie,

reverie, resembles epilepsy, in which there is no sensibility to the stimuli of external objects. Vigilia, or watchfulness, may be compared to the general writhing of the body; which is just a sufficient exertion to relieve the pain which occasions it. Erotomania may be compared to trismus, or other muscular fixed spasm, without much subsequent pain; and mœror to cramp of the muscles of the leg, or other fixed spasm with subsequent pain. All these coincidences contribute to shew, as explained in Sect. III. 5., that our ideas are motions of the immediate organs of sense obeying the same laws as our muscular motions.

The violence of action accompanying insanity depends much on the education of the person; those who have been proudly educated with unrestrained passions, are liable to greater fury; and those, whose education has been humble, to greater despondency. Where the delirious idea, above described, produces pleasurable sensations, as in personal vanity or religious enthusiasm; it is almost a pity to snatch them from their fool's paradise, and reduce them again to the common lot of humanity; lest they should complain of their cure, like the patient described in Horace,

— Pol ! me occidistis, amici,
Non servastis, ait, cui sic extorta voluptas,
Et demptus per vim mentis gratissimus error !

As

As insanities arise from excess of action of the sensorial power of volition, this excess of action may be owing either to the increase of motive or stimulus, or to an increased quantity or accumulation of that sensorial power. And hence, though the greatest number of insanities originate from increased motive to voluntary action, as to avoid pain or to acquire pleasure; yet there appear to be some, which have for their cause an accumulation of the sensorial power of volition.

Thus those, who have been accustomed to perpetual exertions of volition in carrying on some extensive employment or profession during the first half of their lives, are liable to become melancholy, and even to destroy themselves, if they suddenly leave off their very active and anxious exertions, and retire to a situation without employment, of which many instances have occurred. This seems to originate from the pain occasioned by the accumulation of the sensorial power of volition, which now ceases to be expended for want of motive. The *tedium vitæ* described in No. X of this genus of diseases affects indolent people, who possess accumulated sensorial power, but want motive to excite it into such actions of the muscles or ideas, as might in part expend it.

The accumulation of sensorial power from the defect of accustomed actions seems to give rise to some inordinate muscular motions, as the incessant

stant jumping of a squirrel confined in a cage, and some of the motions of children confined too long in schools, which are called tricks. See Class III. 1. 1. 1. and IV. 1. 3. 2. And I am inclined to think, that these insanities, which are termed melancholy, where no previous misfortune has occurred, as in grief or disappointed love, but where the patient fits perpetually brooding over some painful idea, which was not previously excited by any external event, as in the *tedium vitæ*, are in general occasioned by accumulations of sensorial power; and the violent insanities to increase of motive; that is, to those pains or want of pleasure, which excite aversion or desire.

There is finally reason to believe, that not only sensorial power in general is capable of accumulation in those parts which have been accustomed to almost perpetual action; but also that each kind or species of sensorial power, as that of irritation, sensation, volition, and association, is separately capable of accumulation in the parts, which have almost perpetually been actuated by it: which I hope sometime to consider more at large, as I suspect it may supply a key to many of the phænomena not only of insanities and convulsions, but to those of fever.

The disposition to insanity, as well as to convulsion, is believed to be hereditary; and in consequence to be induced in those families from

slighter causes than in others. Convulsions have been shewn to have been most frequently induced by pains owing to defect of stimulus, as the shuddering from cold, and not from pains from excess of stimulus, which are generally succeeded by inflammation. But insanities are on the contrary generally induced by pains from excess of stimulus, as from the too violent actions of our ideas, as in common anger, which is an insanity of short duration; for insanities generally, though not always, arise from pains of the organs of sense; but convulsions generally, though not always, from pains of the membranes or glands. And it has been previously explained, that though the membranes and glands, as the stomach and skin, receive great pain from want of stimulus; yet that the organs of sense, as the eye and ear, receive no pain from defect of stimulus.

Hence it follows, that the constitutions most liable to convulsion, are those which most readily become torpid in some part of the system, that is, which possess less irritability; and that those most liable to insanity, are such as have excess of sensibility; and lastly, that these two circumstances generally exist in the same constitution; as explained in Sect. XXXI. 2. on Temperaments. These observations explain why epilepsy and insanity frequently succeed or reciprocate with each other, and why inirritable habits, as scrofulous

scrofulous ones, are liable to insanity, of which I have known some instances.

In many cases however there is no appearance of the disposition to epilepsy or insanity of the parent being transmitted to the progeny. First, where the insanity has arisen from some violent disappointment, and not from intemperance in the use of spirituous liquors. Secondly, where the parent has acquired the insanity or epilepsy by habits of intoxication after the procreation of his children. Which habits I suppose to be the general cause of the disposition to insanity in this country. See Class III. I. 1. 7.

As the disposition to gout, dropsy, epilepsy, and insanity, appears to be produced by the intemperate use of spirituous potion, and is in all of them hereditary; it seems probable, that this disposition gradually increases from generation to generation, in those families which continue for many generations to be intemperate in this respect; till at length these diseases are produced; that is, the irritability of the system gradually is decreased by this powerful stimulus, and the sensibility at the same time increased, as explained in Sect. XXXI. 1. and 2. This disposition is communicated to the progeny, and becomes still increased, if the same stimulus be continued, and so on by a third and fourth generation; which accounts for the appearance of epilepsy in the children of some families, where it

it was never known before to have existed; and could not be ascribed to their own intemperance. A parity of reasoning shews, that a few sober generations may gradually in the same manner restore a due degree of irritability to the family, and decrease the excess of sensibility.

From hence it would appear probable, that scrofula and dropsy are diseases from inirritability; but that in epilepsy and insanity an excess of sensibility is added, and the two faulty temperaments are thus conjoined.

SPECIES.

1. *Mania mutabilis.* Mutable madness. Where the patients are liable to mistake ideas of sensation for those from irritation, that is, imaginations for realities, if cured of one source of insanity, they are liable in a few months to find another source in some new mistaken or imaginary idea, and to act from this new idea. The idea belongs to delirium, when it is an imaginary or mistaken one; but it is the voluntary actions exerted in consequence of this mistaken idea, which constitute insanity.

In this disease the patient is liable carefully to conceal the object of his desire or aversion. But a constant inordinate suspicion of all people, and a carelessness of cleanliness, and of decency, are generally concomitants of madness. Their designs cannot

cannot be counteracted, till you can investigate the delirious idea or object of their insanity; but as they are generally timid, they are therefore less to be dreaded.

Z. Z. called a young girl, one of his maid-servants, into the parlour, and, with cocked pistols in his hands, ordered her to strip herself naked; he then inspected her with some attention, and dismissed her untouched. Then he stripped two of his male servants in the same manner, to the great terror of the neighbourhood. After he was secured, with much difficulty he was persuaded to tell me, that he had got the itch, and had examined some of his servants to find out from whom he had received it; though at the same time there was not a spot to be seen on his hands, or other parts. The outrages in consequence of this false idea were in some measure to be ascribed to the pride occasioned by unrestrained education, affluent wealth, and dignified family.

Madness is sometimes produced by bodily pain, particularly I believe of a diseased liver, like convulsion and epilepsy; at other times it is caused by very painful ideas occasioned by external circumstances, as of grief or disappointment; but the most frequent cause of insanity arises from the pain of some imaginary or mistaken idea; which may be termed hallucinatio maniacalis. This hallucination of one of the

senses is often produced in an instant, and generally becomes gradually weakened in process of time, by the perpetual stimulus of external objects, or by the successions of other catenations of ideas, or by the operations of medicines; and when the maniacal hallucination ceases, or is forgotten, the violent exertions cease, which were in consequence of it, and the disease is cured.

Mr. ——, a clergyman, about forty years of age, who was rather a weak man, happened to be drinking wine in jocular company, and by accident swallowed part of the seal of a letter, which he had just then received; one of his companions seeing him alarmed, cried out in humour, "It will seal your bowels up." He became melancholy from that instant, and in a day or two refused to swallow any kind of nourishment. On being pressed to give a reason for this refusal, he answered he knew nothing would pass through him. A cathartic was given, which produced a great many evacuations, but he still persisted, that nothing passed through him; and though he was frightened into taking a little broth once or twice by threats, yet he soon ceased intirely to swallow any thing, and died in consequence of this infane idea.

Miss ——, a sensible and ingenious lady, about thirty, said she had seen an angel; who told her, that she need not eat, though all others were under the necessity of supporting their earthly

earthly existence by food. After fruitless persuasions to take food, she starved herself to death. —It was proposed to send an angel of a higher order to tell her, that now she must begin to eat and drink again; but it was not put into execution.

Mrs. ——, a lady between forty and fifty years of age, imagined that she heard a voice say to her one day, as she was at her toilet, “Repent, or you will be damned.” From that moment she became melancholy, and this hallucination affected her in greater or less degree for about two years; she then recovered perfectly, and is now a cheerful old woman.

Mrs. ——, a farmer’s wife, going up stairs to dress, found the curtains of her bed drawn, and on undrawing them, she believed that she saw the corpse of her sister, who was then ill at the distance of twenty miles, and became from that time insane; and as her sister died about that time, she could not be produced to counteract the insane hallucination, but she perfectly recovered in a few months.

Mrs. ——, a most elegant, beautiful, and accomplished lady, about twenty-two years of age, had been married about two months to an elegant, polished, and affluent young man, and it was well known to be a love-match on both sides. She suddenly became melancholy, and yet not to so great a degree, but that she could com-

mand herself to do the honours of her table with grace and apparent ease. After many days intreaty, she at length told me, that she thought her marrying her husband had made him unhappy; and that this idea she could not efface from her mind day or night. I witnessed her being confined, as some had advised, and proposed a sea-voyage to her, with expectation that the sickness as well as change of objects, might remove the insane hallucination, by introducing other energetic ideas; this was not complied with, but she travelled about England with her friends and her husband for many months, and at length perfectly recovered, and is now I am informed in health and spirits.

These cases are related to shew the utility of endeavouring to investigate the maniacal idea, or hallucination; as it may not only acquaint us with the probable designs of the patient, from whence may be deduced the necessity of confinement; but also may some time lead to the most effectual plan of cure.

I received good information of the truth of the following case, which was published a few years ago in the newspapers. A young farmer in Warwickshire, finding his hedges broke, and the sticks carried away during a frosty season, determined to watch for the thief. He lay many cold hours under a hay-stack, and at length an old woman, like a witch in a play, approached,

approached, and began to pull up the hedge; he waited till she had tied up her bottle of sticks, and was carrying them off, that he might convict her of the theft, and then springing from his concealment, he seized his prey with violent threats. After some altercation, in which her load was left upon the ground, she kneeled upon her bottle of sticks, and raising her arms to Heaven beneath the bright moon then at the full, spoke to the farmer already shivering with cold, "Heaven grant, that thou never mayest know again the blessing to be warm." He complained of cold all the next day, and wore an upper coat, and in a few days another, and in a fortnight took to his bed, always saying nothing made him warm, he covered himself with very many blankets, and had a sieve over his face, as he lay; and from this one insane idea he kept his bed above twenty years for fear of the cold air, till at length he died.

M. M. As mania arises from pain either of our muscles or organs of sense, the arts of relieving pain must constitute the method of cure. See Sect. XXXIV. 3. 4. Venesection. Vomits of from five grains to ten of emetic tartar, repeated every third morning for three or four times; with solution of gum ammoniac, and soluble tartar, so as to purge gently every day. Afterwards warm bath for two or three hours a day. Opium in large doses. Bark. Steel.

F 3

Dr.

Dr. Binns gave two scruples (40 grains) of solid opium at a dose, and twenty grains four hours afterwards; which restored the patient. Dr. Brandreth gave 400 drops of laudanum to a maniac in the greatest possible furor, and in a few hours he became calm and rational. Med. Comment. for 1791, p. 384.

Prognostic.

THE temporary quick pulse attending some maniacal cases is simply a symptom of debility; and is the consequence of too great exertions; but a permanent quick pulse shews the presence of fever, and is frequently a salutary sign; because, if the life of the patient be safe, when the fever ceases, the insanity generally vanishes along with it, as mentioned above. In this case the kind of fever must direct the method of curing the insanity; which must consist of moderate evacuations and diluents, if the pulse be strong; or of nutrientia, bark, and small doses of opium, if the pulse be weak.

Where the cause is of a temporary nature, as in puerperal insanity, there is reason to hope, that the disease will cease, when the bruises, or other painful sensations attending this state, are removed. In these cases the child should be brought frequently to the mother, and applied to her breast, if she will suffer it, and this whether

ther she at first attends to it or not; as by a few trials it frequently excites the storgè, or maternal affection, and removes the insanity, as I have witnessed.

When the madness is occasioned by pain of the teeth, which I believe is no uncommon case, these must be extracted; and the cure follows the extinction of the pain. There is however some difficulty in detecting the delinquent tooth in this case, as in hemicrania, unless by its apparent decay, or by some previous information of its pain having been complained of; because the pain of the tooth ceases, as soon as the exertions of insanity commence. In this case salivation might be tried.

When a person becomes insane, who has a family of small children to solicit his attention, the prognostic is very unfavourable; as it shews the maniacal hallucination to be more powerful than those ideas which generally interest us the most.

When an insane young man shews no lascivious idea, when an opportunity of gratifying the passion of love is presented to him, as in the case above mentioned of Z. Z. or when an insane young lady shews no symptom of attachment, when addressed honourably by a proper lover, the prognostic is unfavourable, as it shews the maniacal hallucination to affect the mind stronger than the natural passion of love, which in civilized society is strengthened by restraint.

Paralytic affections are said by Mr. Haslam, to be frequently succeeded by insanity, and that in these cases the inactivity of some paralytic muscles about the face or limbs with defective memory continue along with the insanity; and he adds that these patients are seldom relieved. Observations on Insanity by J. Haslam, 8vo. Rivington. It was before observed, that when some limbs become paralytic, as in the common hemiplegia, that the other limbs are liable to be for some time in almost perpetual action, owing to the superfluity of volition, which was previously expended by the action of those muscles, which are now rendered disobedient to the sensorial power of volition, though they may continue to be excitable by irritation or sensation, as in the act of pandiculation, or by electric shocks. Now if this superfluity of voluntary activity be exerted on the organs of sense, delirious hallucinations and insane actions are the consequence; and as the power of life is already injured in a part of the system, they are less liable to recover, and die like other paralytic patients. And thus the insanities in consequence of paralytic affections, as well as those in consequence of painful sensations or ideas, countenance the theory, that they arise from the excessive activity of the sensorial power of volition.

2. *Studium inane.* Reverie consists of violent voluntary exertions of ideas to relieve pain, with ^{all}

all the trains or tribes connected with them by sensations or associations. It frequently alternates with epileptic convulsions ; with which it corresponds, in respect to the insensibility of the mind to the stimuli of external objects, in the same manner as madness corresponds with common convolution, in the patient's possessing at the same time a sensibility of the stimuli of external objects.

Some have been reported to have been involved in reverie so perfectly, as not to have been disturbed by the discharge of a cannon ; and others to have been insensible to torture, as the martyrs for religious opinions ; but these seem more properly to belong to particular insanities than to reverie, like nostalgie and erotomania.

Reverie is distinguished from madness as described above ; and from delirium, because the trains of ideas are kept consistent by the power of volition, as the person reasons and deliberates in it. Somnambulismus is a part of reverie, somnambulism consisting in the exertions of the locomotive muscles, and reverie in the exertions of the organs of sense ; See Class I. 1. 1. 9. and Sect. XIX. both which are mixed, or alternate with each other, for the purpose of relieving pain.

When the patients in reverie exert their volition on their organs of sense, they can occasionally perceive the stimuli of external objects, as explained in Sect. XIX. And in this case it resembles sometimes an hallucination of the senses,

as

as there is a mixture of fact and imagination in their discourse; but may be thus distinguished: hallucinations of the senses are allied to delirium, and are attended generally with quick pulse, and other symptoms of great debility; but reverie is without fever, and generally alternates with convulsions; and so much intuitive analogy (see Sect. XVII. 3. 7.) is retained in its paroxysms, as to preserve a consistency in the trains of ideas.

Miss G—, whose case is related in Sect. III. 5. 8. said, as I once sat by her, " My head is fallen off, see it is rolled to that corner of the room, and the little black dog is nibbling the nose off." On my walking to the place which she looked at, and returning, and assuring her that her nose was unhurt, she became pacified, though I was doubtful whether she attended to me. See Class III. 1. 1. 9. and Class III. 1. 2. 2.

M. M. Large doses of opium given before the expected paroxysm, as in epilepsia dolorifica, Class III. 1. 1. 8.

The hallucinatio studiosa, or false ideas in reverie, differ from maniacal hallucinations above described, as no insane exertions succeed, and in the patients whom I have seen they have always been totally forgotten, when the paroxysm was over.

Master —, a school-boy about twelve years old, after he came out of a convulsion fit and sat

sat up in bed, said to me, "Don't you see my father standing at the feet of the bed, he is come a long way on foot to see me." I answered, no: "What colour is his coat?" He replied, "A drab colour." "And what buttons?" "Metal ones," he answered, and added, "how sadly his legs are swelled." In a few minutes he said, with apparent surprise, "He is gone," and returned to his perfect mind. Other cases are related in Sect. XIX. and XXXIV. 3. and in Class III. 1. 2. 2. with further observations on this kind of hallucination; which however is not the cause of reverie, but constitutes a part of it, the cause being generally some uneasy sensation of the body.

3. *Vigilia.* Watchfulness consists in the unceasing exertion of volition; which is generally caused by some degree of pain either of mind or of body, or from defect of the usual quantity of pleasurable sensation; hence if those, who are accustomed to wine at night, take tea instead, they cannot sleep. The same happens from want of solid food for supper, to those who are accustomed to use it; as in these cases there is pain or defect of pleasure in the stomach.

Sometimes the anxiety about sleeping, that is the desire to sleep, prevents sleep; which consists in an abolition of desire or will. This may so far be compared to the impediment of speech described

described in Sect. XVII. I. 10. as the interference of the will prevents the effect desired.

Another source of watchfulness may be from the too great secretion of sensorial power in the brain, as in phrenzy, and as sometimes happens from the exhibition of opium, and of wine; if the exhaustion of sensorial power by the general actions of the system occasioned by the stimulus of these drugs can be supposed to be less than the increased secretion of it.

M. M. 1. Solid food to supper. Wine. Opium. Warm bath. 2. The patient should be told that his want of sleep is of no consequence to his health. 3. Venesection by cupping. Abstinence from wine. 4. A blister by stimulating the skin, and rhubarb by stimulating the bowels, will sometimes induce sleep. Exercise. An uniform sound, as of a pausing drop of water, or the murmur of bees. Other means are described in Sect. XVIII. 20.

4. *Ergotomania.* Sentimental love. Described in its excess by romance writers and poets. As the object of love is beauty, and as our perception of beauty consists in a recognition by the sense of vision of those objects, which have before inspired our love, by the pleasure they have afforded to many of our senses (Sect. XVI. 6.); and as brute animals have less accuracy of their sense of vision than mankind (ib.); we see the reason

reason why this kind of love is not frequently observable in the brute creation, except perhaps in some married birds, or in the affection of the mother to her offspring. Men, who have not had leisure to cultivate their taste for visible objects, and who have not read the works of poets and romance-writers, are less liable to sentimental love; and as ladies are educated rather with an idea of being chosen, than of choosing; there are many men, and more women, who have not much of this insanity; and are therefore more easily induced to marry for convenience or interest, or from the flattery of one sex to the other.

In its fortunate gratification sentimental love is supposed to supply the purest source of human felicity; and from the suddenness with which many of those patients, described in species I. of this genus, were seized with the maniacal hallucination, there is reason to believe, that the most violent sentimental love may be acquired in a moment of time, as represented by Shakspere in the beginning of his Romeo and Juliet, as originally written.

Some have endeavoured to make a distinction between beauty and grace, and have made them as it were rivals for the possession of the human heart; but grace may be defined beauty in action; for a sleeping beauty cannot be called graceful in whatever attitude she may recline;
the

the muscles must be in action to produce a graceful attitude, and the limbs to produce a graceful motion. But though the object of love is beauty, yet the idea is nevertheless much enhanced by the imagination of the lover; which appears from this curious circumstance, that the lady of his passion seldom appears so beautiful to the lover after a few months separation, as his ideas had painted her in his absence; and there is, on that account, always a little disappointment felt for a minute at their next interview from this hallucination of his ideas.

This passion of love produces reverie in its first state, which exertion alleviates the pain of it, and by the assistance of hope converts it into pleasure. Then the lover seeks solitude, lest this agreeable reverie should be interrupted by external stimuli, as described by Virgil.

*Tantum inter densas, umbrosa cacumina, fagos
Affidue veniebat, ibi hæc incondita solus
Montibus et sylvis studio jactabat inani.*

When the pain of love is so great, as not to be relieved by the exertions of reverie, as above described; as when it is misplaced on an object, of which the lover cannot possess himself; it may still be counteracted or conquered by the stoic philosophy, which strips all things of their ornaments, and inculcates "nil admirari." Of which lessons may be found in the meditations of

of Marcus Antoninus. The maniacal idea is said in some lovers to have been weakened by the action of other very energetic ideas; such as have been occasioned by the death of his favourite child, or by the burning of his house, or by his being shipwrecked. In those cases the violence of the new idea for a while expends so much sensorial power as to prevent the exertion of the maniacal one; and new catenations succeed. On this theory the lover's leap, so celebrated by poets, might effect a cure, if the patient escaped with life.

The third stage of this disease I suppose is irremediable; when a lover has previously been much encouraged, and at length meets with neglect or disdain; the maniacal idea is so painful as not to be for a moment relievable by the exertions of reverie, but is instantly followed by furious or melancholy insanity; and suicide, or revenge, have frequently been the consequence. As was lately exemplified in Mr. Hackman, who shot Miss Ray in the lobby of the playhouse. So the poet describes the passion of Dido,

— Moriamur inultæ? —

At moriamur, ait, — sic, sic, juvat ire sub umbras!

The story of Medæa seems to have been contrived by Ovid, who was a good judge of the subject, to represent the savage madness occasioned by ill-requited love. Thus the poet,

Earth

Earth has no rage like love to hatred turn'd,
Nor Hell a fury like a woman scorn'd.

DRYDEN.

Hence it appears, that though sentimental love does not so frequently arise spontaneously in female bosoms, yet that it is liable to become as violent, when it has been excited by the courtship of the other sex, and though, when it is rejected, after courtship has produced it, it is not always succeeded by such violent effects as those above mentioned; which may be ascribed to the greater modesty, and reserve of their education; yet the disappointed passion is liable to prey upon their minds even to the hazard of their lives, of which I have witnessed two instances, in both which the effects approached to that occasioned by great grief. See Mœror, Class III. 1. 2. 10.

One of these ladies, about 30 years of age, was deserted by an Irish gentleman, who was soon to have married her; she was seized suddenly with a stupor, which by those, who were not acquainted with the cause, was mistaken for a kind of apoplexy; she gradually recovered so as to apply to her usual habits of life, and in four or five years regained her cheerfulness, and married another man. The other was affected with long stupor, loss of digestion, and total inability of mind and body, which continued a year or two, and from which she also gradually recovered.

5. *Amor*

5. *Amor sui.* Vanity consists of an agreeable reverie, and is well ridiculed in the story of Narcissus, who so long contemplated his own beautiful image in the water, that he died from neglect of taking sustenance. I once saw a handsome young man, who had been so much flattered by his parents, that his vanity rose so near to insanity, that one might discern by his perpetual attention to himself, and the difficulty with which he arranged his conversation, that the idea of himself intruded itself at every comma or pause of his discourse. In this degree vanity must afford great pleasure to the possessor; and when it exists within moderate bounds, may contribute much to the happiness of social life.

My friend Mr. —— once complained to me, that he was much troubled with bashfulness in company, and believed that it arose from his want of personal vanity; on this account he determined on a journey to Paris, when Paris was the centre of politeness; he there learnt to dress, to dance, and to move his hands gracefully in conversation; and returned a most consummate coxcomb. But after a very few years he relapsed into rusticity of dress and manners.

M. M. The cure of vanity may be attempted by excess of flattery, which will at length appear ridiculous, or by its familiarity will cease to be desired. I remember to have heard a story of a nobleman in the court of France, when France had a

court, who was so disagreeably vain in conversation, that the king was pleased to direct his cure, which was thus performed. Two gentlemen were directed always to attend him, one was to stand behind his chair, and the other at a respectful distance before him; whenever his lordship began to speak, one of them always pronounced, "Lord Gallimaufre is going to say the best thing in the world." And, as soon as his lordship had done speaking, the other attendant pronounced, "Lord Gallimaufre has spoken the best thing in the world." Till in a few weeks this noble lord was so disgusted with praise that he ceased to be vain; and his majesty dismissed his keepers.

6. *Noftalgia*. Maladie de Pais. Calenture. An unconquerable desire of returning to one's native country, frequent in long voyages, in which the patients become so insane as to throw themselves into the sea, mistaking it for green fields or meadows. The Swiss are said to be particularly liable to this disease, and when taken into foreign service frequently to desert from this cause, and especially after hearing or singing a particular tune, which was used in their village dances, in their native country, on which account the playing or singing this tune was forbid by the punishment of death. Zwingerus.

Dear is that shed, to which his soul conforms,
And dear that hill, which lifts him to the storms.

GOLDSMITH.

7. *Spes*

7. *Spes religiosa.* Superstitious hope. This maniacal hallucination in its milder state produces, like sentimental love, an agreeable reverie; but when joined with works of supererogation, it has occasioned many enormities. In India devotees consign themselves by vows to most painful and unceasing tortures, such as holding up their hands, till they cannot retract them; hanging up by hooks put into the thick skin over their shoulders, sitting upon sharp points, and other self torments. While in our part of the globe fasting and mortification, as flagellation, has been believed to please a merciful deity! The serenity, with which many have suffered cruel martyrdoms, is to be ascribed to this powerful reverie.

Mr. ——, a clergyman, formerly of this neighbourhood, began to bruise and wound himself for the sake of religious mortification, and passed much time in prayer, and continued whole nights alone in the church. As he had a wife and family of small children, I believed the case to be incurable; as otherwise the affection and employment in his family connections would have opposed the beginning of this insanity. He was taken to a madhouse without effect, and after he returned home, continued to beat and bruise himself, and by this kind of mortification, and by sometimes long fasting, he at length became emaciated and died. I once told him in

conversation, that "God was a merciful being, and could not delight in cruelty; but that I supposed he worshipped the devil." He was struck with this idea, and promised me not to beat himself for three days, and I believe kept his word for one day. If this idea had been frequently forced on his mind, it might probably have been of service.

When these works of supererogation have been of a public nature, what cruelties, murders, massacres, has not this insanity introduced into the world!—A commander, who had been very active in leading and encouraging the bloody deeds of St. Bartholomew's day at Paris, on confessing his sins to a worthy ecclesiastic on his death-bed, was asked, "Have you nothing to say about St. Bartholomew?" "On that day," he replied, "God Almighty was obliged to me!"—The fear of Hell is another insanity, which will be spoken of below.

8. *Superbia stemmatis.* Pride of family has frequently formed a maniacal hallucination, which in its mild state has consisted in agreeable reverie, but when it has been so painful as to demand homage from others, it has frequently induced insane exertions. This insanity seems to have existed in the flourishing state of Rome, as now all over Germany, and is attacked by Juvenal

venal with great severity, a small part of which I shall here give as a method of cure. Sat. 8.

Say, what avails the pedigree, that brings
Thy boasted line from heroes or from kings;
Though many a mighty lord, in parchment roll'd,
Name after name, thy coxcomb hands unfold;
Though wreathed patriots crowd thy marble halls,
Or steel-clad warriors frown along the walls;
While on broad canvas in the gilded frame
All virtues flourish, and all glories flame?—
Say,—if ere noon with idiot laugh you lie
Wallowing in wine, or cog the dubious die,
Or act unshamed, by each indignant bust,
The midnight orgies of promiscuous lust!—

Go, lead mankind to Virtue's holy shrine,
With morals mend them, and with arts refine,
Or lift, with golden characters unfurl'd,
The flag of peace, and save a warring world!—
—So, shall with pious hands immortal Fame
Wreath all her laurels round thy honour'd name,
High o'er thy tomb with chissel bold engrave,
“THE TRULY NOBLE ARE THE GOOD AND BRAVE.”

9. *Ambitio.* Inordinate desire of fame. A carelessness about the opinions of others is said by Xeriphon to be the source of impudence; certainly a proper regard for what others think of us frequently incites us to virtuous actions, and deters us from vicious ones; and increases our happiness by enlarging our sphere of sympathy, and by flattering our vanity..

Abstract what others feel, what others think,
All pleasures sicken, and all glories sink.

POPE.

When this reverie of ambition excites to conquer nations, or to enslave them, it has been the source of innumerable wars, and the occasion of a great devastation of mankind. Cæsar is reported to have boasted, that he had destroyed three millions of his enemies, and one million of his friends.

The works of Homer are supposed to have done great injury to mankind by inspiring the love of military glory. Alexander was said to sleep with them always on his pillow. How like a mad butcher amid a flock of sheep appears the hero of the Iliad, in the following fine lines of Mr. Pope, which conclude the twentieth book.

His fiery coursers, as the chariot rolls,
Tread down whole ranks, and crush out heroes' souls;
Dash'd from their hoofs, as o'er the dead they fly,
Black bloody drops the smoking chariot dye;—
The spiky wheels through heaps of carnage tore,
And thick the groaning axles dropp'd with gore;
High o'er the scene of death ACHILLES stood,
All grim with dust, all horrible with blood;
Yet still insatiate, still with rage on farré,
Such is the lust of never dying farré!

The cure must be taken from moral writers. Woolaston says, Cæsar conquered Pompey; that is,

is, a man whose name consisted of the letters C, æ, f, a, r, conquered a long time ago a man, whose name consisted of the letters P, o, m, p, e, y, and that this is all that remains of either of them. Juvenal also attacks this mode of insanity, Sat. X. 166.

I, demens, et sœvas curre per Alpes,
Ut pueris placeas, et declamatio fias!

Which is thus translated by Dr. Johnson,

And left a name, at which the world grew pale,
To point a moral, or adorn a tale!

10. *Mæror*. Grief. A perpetual voluntary contemplation of all the circumstances of some great loss, as of a favourite child. In general the painful ideas gradually decrease in energy, and at length the recollection becomes more tender and less painful. The letter of Sulpicius to Cicero on the loss of his daughter is ingenious. The example of David on the loss of his child is heroic.

A widow lady was left in narrow circumstances with a boy and a girl, two beautiful and lively children, the one six, and the other seven years of age; as her circumstances allowed her to keep but one maid-servant, these two children were the sole attention, employment, and consolation of her life; she fed them, dressed them, slept with them, and taught them herself; they were both snatched from her by the gangrenous sore throat in one week: so

that she lost at once all that employed her, as well as all that was dear to her. For the first three or four days after their death, when any friend visited her, she sat upright, with her eyes wide open, without shedding tears, and affected to speak of indifferent things. Afterwards she began to weep much, and for some weeks talked to her friends of nothing else but her dear children. But did not for many years, even to her dying hour, get quite over a gloom, which was left upon her countenance.

In violent grief, when tears flow, it is esteemed a good symptom; because then the actions caused by sensitive association 'take' the place of those caused by volition; that is, they prevent the voluntary exertions of ideas, or muscular actions, which constitute insanity.

The sobbing and sighing attendant upon grief are not convulsive movements, they are occasioned by the sensorial power being so expended on the painful ideas, and their connections, that the person neglects to breathe for a time, and then a violent sigh or sob is necessary to carry on the blood, which oppresses the pulmonary vessels, which is then performed by deep or quick inspirations, and laborious expirations. Sometimes nevertheless the breath is probably for a while voluntarily held, as an effort to relieve pain. The paleness and ill health occasioned by long grief are spoken of in Class IV. 2. 1. 9.

The melioration of grief by time, and its being

ing at length even attended with pleasure, depends on our retaining a distinct idea of the lost object, and forgetting for a time the idea of the loss of it. This pleasure of grief is beautifully described by Akenside. *Pleasures of Imagination*, Book II. l. 680.

— Ask the faithful youth,
 Why the cold urn of her, whom long he loved,
 So often fills his arms; so often draws
 His lonely footsteps at the silent hour
 To pay the mournful tribute of his tears?
 Oh! he will tell thee, that the wealth of worlds
 Should ne'er seduce his bosom to forego
 That sacred hour; when, stealing from the noise
 Of care and envy, sweet remembrance soothes
 With Virtue's kindest looks his aching breast,
 And turns his tears to rapture.

M. M. Consolation is best supplied by the Christian doctrine of a happy immortality. In the Pagan religion the power of dying was the great consolation in irremediable distress. Seneca says, "no one need be unhappy unless by his own fault." And the author of *Telemachus* begins his work by saying, that Calypso could not console herself for the loss of Ulysses, and found herself unhappy in being immortal. In the first hours of grief the method of consolation used by uncle Toby, in *Tristram Shandy*, is probably the best; "he sat down in an arm chair by the bed of his distressed friend, and said nothing."

11. *Tedium*

II. *Tedium vite.* Ennui. Irksomeness of life. The inanity of sublunary things has afforded a theme to philosophers, moralists, and divines, from the earliest records of antiquity; “Vanity of vanities!” says the preacher, “all is vanity!” Solomon. “Man is the dream of a shadow!” Σκιας οντας ανθρωπος. Pindar. O! quantum est in rebus inane! Juvenal. Nor is there any one, I suppose, who has passed the meridian of life, who has not at some moments felt the nihility of all things.

Weariness of life or ennui in its moderate degree has been esteemed a motive to action by some philosophers. See Sect. XXXIV. 2. 3. But in those men, who have run through the usual amusements of life early in respect of their age; and who have not industry or ability to cultivate those sciences, which afford a perpetual fund of novelty, and of consequent entertainment, are liable to become tired of life, as they suppose there is nothing new to be found in it, that can afford them pleasure; like Alexander, who is said to have shed tears because he had not another world to conquer.

Mr. ———, a gentleman, about fifty, of polished manners, who in a few months afterwards destroyed himself, said to me one day, “A ride out in the morning, and a warm parlour and a pack of cards in the afternoon, are all that life affords.” He was persuaded to

to have an issue on the top of his head, as he complained of a dull head-ach, which being unskilfully managed, destroyed the pericranium to the size of an inch in diameter; during the time this took in healing, he was indignant about it, and endured life, but soon afterwards shot himself.

Mr. ——, a gentleman of Gray's Inn, some years ago was prevailed upon by his friends to dismiss a mistress, by whom he had a child, but who was so great a termagant and scold, that she was believed to use him very ill, and even to beat him. He became melancholy in two days from the want of his usual stimulus to action, and cut his throat on the third so completely, that he died immediately.

Mr. Anson, the brother to the late lord Anson, related to me the following anecdote of the death of lord Sc——. His lordship sent to see Mr. Anson on the Monday preceding his death, and said, "You are the only friend I value in the world, I determined therefore to acquaint you, that I am tired of the infidelity of life, and intend to-morrow to leave it." Mr. Anson said, after much conversation, that he was obliged to leave town till Friday, and added, "As you profess a friendship for me, do me this last favour, I entreat you, live till I return." Lord Sc—— believed this to be a pious artifice to gain time, but nevertheless agreed, if he should return by four o'clock

o'clock on that day. Mr. Anson did not return till five, and perceived by the countenances of the domestics, that the deed was done. He went into his chamber and found the corpse of his friend leaning over the arm of a great chair, with the pistol on the ground by him, the ball of which had been discharged into the roof of his mouth, and passed into his brain.

Mr. —— and Mr. ——, two young men, heirs to considerable fortunes, shot themselves at the age of four or five and twenty, without their friends being able to conjecture any cause for those rash actions. One of them I had long known to express himself with dissatisfaction of the world; at eighteen years of age he complained, that he could not entertain himself; he tried to study the law at Cambridge, and afterwards went abroad for a year or two by my advice; but returned dissatisfied with all things. As he had an eruption for some years on a part of his face, which he probably endeavoured to remove by external applications; I was induced to ascribe his perpetual ennui to the pain or disagreeable sensation of a diseased liver. The other young gentleman shot himself in his bedroom, and I was informed that there was found written on a scrap of paper on his table, "I am impotent; and therefore not fit to live." From whence there was reason to conclude, that this

was the hallucinatio maniacalis, the delirious idea, which caused him to destroy himself. The case therefore belongs to mania mutabilis, and not to tedium vitae.

Those, who have been employed during the first half of their lives in some very active business, and suddenly leave it, are liable to this kind of insanity, and even to suicide; of which I have known two instances, one of them a Birmingham manufacturer, and the other a great and successful commander. This may be ascribed to the accumulation of the sensorial power of volition, and the want of motive to exert or expend it, and which thence becomes painful. See pain of cold from the want of stimulus. III. 2. 1. 17.

This may afford consolation to those, whose situation in life obliges them to use perpetual industry in their occupations: they may say, that as they have been long in the habit of exerting much voluntary action, they must continue to employ themselves; otherwise that they shall sink into low spirits, as it is called, and become unhappy. And as the continuance of activity is now necessary to their happiness, they had better employ themselves on such objects, as are useful to themselves or their connections, than to consume their time, and misapply their labour, in card-playing, wine-drinking, or fox-hunting, which are other methods of relieving ennui or the

irksomeness of life by exertion, and consequent expenditure of voluntary power.

Less degrees of this malady are erroneously termed hypochondriacism, see Class I. 2. 4. 10, by the people, and are generally ascribed to the want of voluntary power, or of industry; but I believe it is generally owing to want of motive or stimulus; and that the pain attending this state of our ideas or muscles is occasioned by accumulation of voluntary power, as above mentioned. The cure of this disease, is popularly known to consist in any kind of voluntary exertion of the mind, or of the body; one of our poets has personified hypochondriacism, and well advises the use of exercise, or exertion to oppose the monster, and says,

“ Throw but a stone, the giant dies.”

To this should be added, that those, who have been educated in indolence, do not find or feel anxiety, or the pain of existence, when they are inactive; like our domestic animals, as dogs and cats, who sleep by the fire without inclination to hang or drown themselves; as these beings, not having been long accustomed to expend much voluntary power, are not liable to much accumulation of it, and uneasiness in consequence; which is not so however with the more active squirrel before mentioned.

But on the contrary, those, whose education has

has induced them to use much voluntary exertion, and have afterwards had no active employment, as happens to some unmarried ladies, are more liable, as I have repeatedly witnessed, to this malady; an idea, which should be attended to in female education.

Another source of ennui or tedium vita is also derived from wrong education, and is immediately owing to the want of stimulus rather than to the great accumulation of voluntary power; and is liable to attend some ladies in high life, whose exertions during their early years were excited by the flattery of numerous menial servants. And afterwards, when this flattery ceases by their living with their equals, they want their accustomed motive to activity, and in consequence become indolent and unhappy, as further described in Class III. 2. 1. 8. under the name of *Paresis voluntaria*.

M. M. The prevention of this malady must consist in the due care of education. Those who are not designed for very active life, particularly young ladies, should not be forced in their early years to use too violent or too constant voluntary exertions. They should not be flattered into all their exertions, but should be taught to act from duty to themselves and others, or for their future advantage as well as for their present amusement. Some restraint in exhausting the usual pleasures of the world in early life should be laid on

young men of fortune; and afterwards the pleasures and solitudes of a matrimonial life are strongly to be recommended; and finally the cultivation of science, as of chemistry, natural philosophy, natural history, which supplies an inexhaustible source of pleasurable novelty, and relieves ennui by the exertions it occasions.

In many of these cases, when irksomeness of life has been the ostensible cause of suicide, there has probably existed a maniacal hallucination, a painful idea, which the patient has concealed even to his dying hour; except where the mania has evidently arisen from hereditary or acquired disease of the membranous or glandular parts of the system.

12. *Pulchritudinis desiderium.* The loss of beauty, either by disease, as by the small-pox, or by age, as life advances, is sometimes painfully felt by ladies, who have been much flattered on account of it. There is a curious case of this kind related in le Sage's Bachelor of Salamanca, which is too nicely described to be totally imaginary.

In this situation some ladies apply to what are termed cosmetics under various names, which crowd the newspapers. Of these the white has destroyed the health of thousands; a calx, or magistery, of bismuth is supposed to be sold in the shops for this purpose; but it is either, I am informed, in part or entirely white lead or cerussa,

The

The pernicious effects of the external use of those saturnine applications are spoken of in *gutta rosea*, Class II. 1. 4 6. The real calx of bismuth would probably have the same ill effect. As the red paint is prepared from cochineal, which is an animal body, less if any injury arises from its use, as it only lies on the skin like other filth.

The tan of the skin occasioned by the sun may be removed by lemon juice evaporated by the fire to half its original quantity, or by diluted marine acid; which cleans the cuticle, by eroding its surface, but requires much caution in the application; the marine acid must be diluted with water, and then put upon the hand or face, after a second of time, as soon as the tan disappears, the part must be washed with a wet towel and much warm water. Freckles lie too deep for this operation, nor are they in general removable by a blister, as I once experienced. See Class I. 2. 2. 9.

It is probable, that those materials which stain silk, or ivory, might be used to stain the cuticle, or hair, permanently; as they are all animal substances. But I do not know, that any trials of this kind have been made on the skin. I endeavoured in vain to whiten the back of my hand by marine acid oxygenated by manganese, which so instantly whitens cotton.

The cure therefore must be sought from moral
VOL. IV. H writers,

writers, and the cultivation of the graces of the mind, which are frequently a more valuable possession than celebrated beauty.

13. *Paupertatis timor.* The fear of poverty is one kind of avarice; it is liable to affect people who have left off a profitable and active business; as they are thus deprived of their usual exertions, and are liable to observe the daily expenditure of money, without calculating the source from whence it flows. It is also liable to occur with a sudden and unexpected increase of fortune. Mr. —, a surgeon, about fifty years of age, who was always rather of a parsimonious disposition, had a large house, with a fortune of forty thousand pounds, left him by a distant relation; and in a few weeks became insane from the fear of poverty, lamenting that he should die in a jail or a workhouse. He had left off a laborious country business, and the daily perception of profit in his books; he also now saw greater expenses going forwards in his new house, than he had been accustomed to observe, and did not so distinctly see the source of supply; which seems to have occasioned the maniacal hallucination.— This idea of approaching poverty is a very frequent and very painful disease, so as to have induced many to become suicides, who were in good circumstances; more perhaps than any other maniacal hallucination, except the fear of Hell.

The

The covetousness of age is more liable to affect single men, than those who have families; though an accumulation of wealth would seem to be more desirable to the latter. But an old man in the former situation, has no personal connections to induce him to open his purse; and having lost the friends of his youth, and not easily acquiring new ones, feels himself alone in the world: feels himself unprotected, as his strength declines, and is thus led to depend for assistance on money, and on that account wishes to accumulate it. Whereas the father of a family has not only those connections, which demand the frequent expenditure of money, but feels a consolation in the friendship of his children, when age may render their good offices necessary to him.

M. M. I have been well informed of a medical person in good circumstances in London, who always carries an account of his affairs, as debtor and creditor, in his pocket-book; and looks over it frequently in a day, when this disease returns upon him; and thus, by counteracting the maniacal hallucination, wisely prevents the increase of his insanity. Another medical person, in London, is said to have cured himself of this disease by studying mathematics with great attention; which exertion of the mind relieved the pain of the maniacal hallucination.

Many moral writers have stigmatised this insanity

nity; the covetous, they say, commit crimes and mortify themselves without hopes of reward; and thus become miserable both in this world and the next. Thus Juvenal:

Cum furor haud dubius, cum sit manifesta phrenitis,
Ut locuples moriaris, egenti vivere fato!

The covetous man thought he gave good advice to the spendthrift, when he said, "Live like me," who well answered him,

" Like you, Sir John?
" That I can do, when all I have is gone!" POPE.

14. *Lethi timor.* The fear of death perpetually employs the thoughts of these patients; hence they are devising new medicines, and applying to physicians and quacks without number. It is confounded with hypochondriasis, Class I. 2. 3. 9. in popular conversation, but is in reality an insanity.

A young gentleman, whom I advised to go abroad as a cure for this disease, assured me, that during the three years he was in Italy and France he never passed a quarter of an hour without fearing he should die. But he has now for above twenty years experienced the contrary.

The sufferers under this malady are generally at once discoverable by their telling you, amidst an unconnected description of their complaints,

that

that they are nevertheless not afraid of dying. They are also easily led to complain of pains in almost any part of the body, and are thus soon discovered.

M. M. As the maniacal hallucination has generally arisen in early infancy from some dreadful account of the struggles and pain of dying, I have sometimes observed, that these patients have received great consolation from the instances I have related to them of people dying without pain. Some of these, which I think curious, I shall concisely relate, as a part of the method of cure.

Mr. ——, an elderly gentleman, had sent for me one whole day before I could attend him; on my arrival he said he was glad to see me, but that he was now quite well, except that he was weak, but had had a pain in his bowels the day before. He then lay in bed with his legs cold up to the knees, his hands and arms cold, and his pulse scarcely discernible, and died in about six hours. Mr. ——, another gentleman about sixty, lay in the act of dying, with difficult respiration like groaning, but in a kind of stupor or coma vigil, and every ten or twelve minutes, while I sat by him, he waked, looked up, and said, "who is it groans so, I am sure there is somebody dying in the room," and then sunk again into a kind of sleep. From these two

cases there appeared to be no pain in the act of dying, which may afford consolation to all, but particularly to those who are afflicted with the fear of death.

15. *Orci timor.* The fear of Hell. Many theatrical preachers among the Methodists successfully inspire this terror, and live comfortably upon the folly of their hearers. In this kind of madness the poor patients frequently commit suicide; although they believe they run headlong into the Hell, which they dread! Such is the power of oratory, and such the debility of the human understanding!

Those, who suffer under this insanity, are generally the most innocent and harmless people; who are then liable to accuse themselves of the greatest imaginary crimes, and have so much intellectual cowardice, that they dare not reason about those things, which they are directed by their priests to believe, however contradictory to human apprehension, or derogatory to the great Creator of all things. The maniacal hallucination at length becomes so painful, that the poor insane flies from life to become free from it.

M. M. Where the intellectual cowardice is great, the voice of reason is ineffectual; but that of ridicule may save many from those mad-making doctors; though it is too weak to cure those,

who

who are already hallucinated. Foote's Farces are recommended for this purpose.

16. *Satyriasis.* An ungovernable desire of venereal indulgence. The remote cause is probably the stimulus of the semen ; whence the phallus becomes distended with blood by the arterial propulsion of it being more strongly excited than the correspondent venous absorption. At the same time a new sense is produced in the other termination of the urethra ; which, like itching, requires some exterior friction to facilitate the removal of the cause of the maniacal actions, which may probably be increased in those cases by some associated hallucinations of ideas. It differs from priapismus chronicus in the desire of its appropriated object, which is not experienced in the latter, Class I. 1. 4. 6. and from the priapismus amatorius, Class II. 1. 7. 9. in the maniacal actions in consequence of desire. The furor uterinus, or nymphomania, is a similar disease.

M. M. Venesection. Cathartics. Torpentina. Marriage.

17. *Ira.* Anger is caused by offended pride. We are not angry at breaking a bone, but become quite insane from the smallest stroke of a whip from an inferior. *Ira furor brevis.* Anger is not only itself a temporary madness, but is a

frequent attendant on other insanities, and as, whenever it appears, it distinguishes insanity from delirium, it is generally a good sign in fevers with debility.

An injury voluntarily inflicted on us by others excites our exertions of self-defence or of revenge against the perpetrator of it; but anger does not succeed in any great degree unless our pride is offended; this idea is the maniacal hallucination, the pain of which sometimes produces such violent and general exertions of our muscles and ideas, as to disappoint the revenge we meditate, and vainly to exhaust our sensorial power. Hence angry people, if not further excited by disagreeable language, are liable in an hour or two to become humble, and sorry for their violence, and willing to make greater concessions than required.

M. M: Be silent; when you feel yourself angry. Never use loud oaths, violent upbraiding, or strong expressions of countenance, or gesticulations of the arms, or clenched fists; as these by their former associations with anger will contribute to increase it. I have been told of a sergeant or corporal, who began moderately to cane his soldiers, when they were awkward in their exercise, but being addicted to swearing and coarse language, he used soon to enrage himself by his own expressions of anger, till toward the end he was liable to beat the delinquents unmercifully.

18. *Rabies.*

18. *Rabies.* Rage. A desire of biting others, most frequently attendant on canine madness. Animals in great pain, as in the colica saturnina, are said to bite the ground they lie upon, and even their own flesh: I have seen patients bite the attendants, and even their own arms, in the epilepsia dolorifica. It seems to be an exertion to relieve pain, as explained in Sect. XXXIV. 1. 3. The dread of water in hydrophobia is occasioned by the repeated painful attempts to swallow it, and is therefore not an essential or original part of the disease called canine madness. See Class III. 1. 1. 15.

There is a mania reported to exist in some parts of the east, in which a man is said to run a muck; and these furious maniacs are believed to have induced their calamity by unlucky gaming, and afterwards by taking large quantities of opium; whence the pain of despair is joined with the energy of drunkenness; they are then said to sally forth into the most populous streets, and to wound and slay all they meet, till they receive their own death, which they desire to procure without the greater guilt, as they suppose, of suicide.

M. M. When there appears a tendency to bite in the painful epilepsy, the end of a rolled up towel, or a wedge of soft wood, should be put into the mouth of the patient. As a bullet is said sometimes to be given to a soldier, who is

to

to be severely flogged, that he may by biting it better bear his punishment.

19. *Citta.* A desire to swallow indigestible substances. I once saw a young lady, about ten years of age, who filled her stomach with the earth out of a flower-pot, and vomited it up with small stones, bits of wood, and wings of insects amongst it. She had the bombycinous complexion, and looked like a chlorotic patient, though so young ; this generally proceeds from an acid in the stomach.

M. M. A vomit. *Magnesia alba.* *Armenian bole.* *Rhubarb.* *Bark.* *Steel.* A blister. See Class I. 2. 4. 5.

20. *Cacofitia.* Aversion to food. This may arise, without disease of the stomach, from connecting nauseous ideas to our usual food, as by calling a ham a hog's a---. This madness is much inculcated by the stoic philosophy. See Antoninus' Meditations. See two cases of patients who refused to take nourishment, Class III. I. 2. 1.

Aversions to peculiar kinds of food are thus formed early in life by association of some maniacal hallucination with them. I remember a child, who on tasting the gristle of sturgeon, asked what gristle was ? And being told it was like the division of a man's nose, received an ideal hallucination ;

hallucination ; and for twenty years afterwards could not be persuaded to taste sturgeon.

The great fear or aversion, which some people experience at the sight of spiders, toads, crickets, and the like, have generally had a similar origin.

M. M. Associate agreeable ideas with those which disgust ; as call a spider ingenious, a frog clean and innocent ; and repress all expressions of disgust by the countenance, as such expressions contribute to preserve, or even to increase the energy of the ideas associated with them ; as mentioned above in Species 17. Ira.

21. *Syphillis imaginaria*. The fear that they are infected with the venereal disease, when they have only deserved it, is a very common insanity amongst modest young men ; and is not to be cured without applying artfully to the mind ; a little mercury must be given, and hopes of a cure added weekly and gradually by interview or correspondence for six or eight weeks. Many of these patients have been repeatedly salivated without curing the mind !

22. *Psora imaginaria*. I have twice seen an imaginary itch, and twice an imaginary diabetes, where there was not the least vestige of either of those diseases, and once an imaginary deafness, where the patient heard perfectly well. In all these

these cases the hallucinated idea is so powerfully excited, that it is not to be changed suddenly by ocular sensation, or reason. Yet great perseverance in the frequently presenting contrary ideas will sometimes slowly remove this hallucination, or in great length of time oblivion, or forgetfulness, performs a cure, by other means in vain attempted.

23. *Tabes imaginaria.* This imaginary disease, or hallucination, is caused by the supposed too great frequency of parting with the semen, and had long imposed upon the physician as well as the patient, till Mr. John Hunter first endeavoured to shew, that in general the morbid effects of this pollution were in the imagination; and that those were only liable to those effects in general, who had been terrified by the villainous books, which pretend to prevent or to cure it, but which were purposely written to vend some quack medicine. Most of those unhappy patients, whom I have seen, had evidently great impression of fear and self-condemnation on their minds, and might be led to make contradictory complaints in almost any part of the body, and if their confessions could be depended on, had not used this pollution to any great excess.

M. M. 1. Assure them if the loss of the semen happens but twice a week, it will not injure them.

2. Marry them. The last is a certain

cure;

cure; whether the disease be real or imaginary. Cold partial bath, and astringent medicines frequently taken, only recal the mind to the disease, or to the delinquency; and thence increase the imaginary effects and the real cause, if such exists. Mr. —— destroyed himself to get free from the pain of fear of the supposed ill consequences of self-pollution, without any other apparent disease; whose parents I had in vain advised to marry him, if possible.

24. *Sympathia aliena.* Pity. Our sympathy with the pleasures and pains of others distinguishes men from other animals; and is probably the foundation of what is termed our moral sense; and the source of all our virtues. See Sect. XXII. 3. 3. When our sympathy with those miseries of mankind, which we cannot alleviate, rises to excess, the mind becomes its own tormentor; and we add to the aggregate sum of human misery, which we ought to labour to diminish; as in the following eloquent lamentation from Akenfide's *Pleasures of Imagination*, Book II. l. 200.

— — — — — Dark,
As midnight storms, the scene of human things
Appear'd before me; deserts, burning sands,
Where the parch'd adder dies; the frozen south;
And desolation blasting all the west
With rapine and with murder. Tyrant power
Here sits enthroned in blood; the baleful charms
Of superstition there infect the skies,

And

And turn the sun to horror. Gracious Heaven !
What is the life of man ? Or cannot these,
Not these portents thy awful will suffice ?
That, propagated thus beyond their scope,
They rise to act their cruelties anew
In my afflicted bosom, thus decreed
The universal sensitive of pain,
The wretched heir of evils not its own !

A poet of antiquity, whose name I do not collect, is said to have written a book describing the miseries of the world, and to have destroyed himself at the conclusion of his task. This sympathy, with all sensitive beings, has been carried so far by some individuals, and even by whole tribes, as the Gentoos, as not only to restrain them from killing animals for their support, but even to induce them to permit insects to prey upon their bodies. Such is however the condition of mortality, that the first law of nature is, " Eat or be eaten." We cannot long exist without the destruction of other animal or vegetable beings, either in their mature or their embryon state. Unless the fruits, which surround the seeds of some vegetables, or the honey stolen from them by the bee, may be said to be an exception to this assertion. See Botanic Garden, P. I. Cant. I. l. 278. Note. Hence, from the necessity of our nature, we may be supposed to have a right to kill those creatures, which we want to eat, or which want to eat us. But to
destroy

destroy even insects wantonly shews an unreflecting mind or a depraved heart.

Nevertheless mankind may be well divided into the selfish and the social; that is, into those whose pleasures arise from gratifying their appetites, and those whose pleasures arise from their sympathizing with others. And according to the prevalence of these opposing propensities we value or dislike the possessor of them.

In conducting the education of young people, it is a nice matter to inspire them with so much benevolent sympathy, or compassion, as may render them good and amiable; and yet not so much as to make them unhappy at the sight of incurable distress. We should endeavour to make them alive to sympathize with all remediable evils, and at the same time to arm them with fortitude to bear the sight of such irremediable evils, as the accidents of life must frequently present before their eyes. About this I have treated more at large in a plan for the conduct of a boarding-school for ladies, which I intend to publish in the course of the next year.

25. *Educatio heroica.* From the kinds and degrees of infantries already enumerated, the reader will probably recollect many more from his own observation; he will perceive that all extraordinary exertions of voluntary action in consequence

of some false idea or hallucination, which strongly affects us, may philosophically, though not popularly, be termed an insanity; he will then be liable to divide these voluntary exertions into disagreeable, pernicious, detestable, or into meritorious, delectable, and even amiable, insanities. And will lastly be induced to conceive, that a good education consists in the art of producing such happy hallucinations of ideas, as may be followed by such voluntary exertions, as may be termed meritorious or amiable insanities.

The old man of the mountain in Syria, who governed a small nation of people called Assassines, is recorded thus to have educated those of his army who were designed to assassinate the princes with whom he was at war. A young man of natural activity was chosen for the purpose, and thrown into a deep sleep by opium mixed with his food; he was then carried into a garden made to represent the paradise of Mahomet, with flowers of great beauty and fragrance, fruits of delicious flavour, and beautiful Houries beckoning him into the shades. After a while, on being a second time stupified with opium, the young enthusiast was reconveyed to his apartment; and on the next day was assured by a priest, that he was designed for some great exploit, and that by obeying the commands of their prince, immortal happiness awaited him.

Hence

Hence it is easy to collect how the first impressions made on us by accidental circumstances in our infancy continue through life to bias our affections, or mislead our judgments. One of my acquaintance can trace the origin of his own energies of action from some such remote sources, which justifies the observation of M. Rousseau, that the seeds of future virtues or vices are often sown by the mother than the tutor.

ORDO II.

Decreased Volition.

GENUS I.

With decreased Actions of the Muscles.

OUR muscles become fatigued by long contraction, and cease for a time to be excitable by the will; owing to exhaustion of the sensorial power, which resides in them. After a short interval of relaxation the muscle regains its power of voluntary contraction; which is probably occasioned by a new supply of the spirit of animation. In weaker people these contractions cease sooner, and therefore recur more frequently, and are attended with shorter intervals of relaxation, as exemplified in the quickness of the pulse in fevers with debility, and in the tremors of the hands of aged or feeble people.

After a common degree of exhaustion of the sensorial power in a muscle, it becomes again gradually restored by the rest of the muscle, and even accumulated in those muscles, which are most frequently used; as in those which constitute the capillaries of the skin after having been rendered torpid by cold. But in those muscles, which are generally obedient to volition, as those of locomotion, though their usual quantity of sensorial power is restored by their quiescence, or in sleep (for sleep affects

affects these parts of the system only), yet but little accumulation of it succeeds. And this want of accumulation of the sensorial power in these muscles, which are chiefly subservient to volition, explains to us one cause of their greater tendency to paralytic affection.

It must be observed, that those parts of the system, which have been for a time quiescent from want of stimulus, as the vessels of the skin, when exposed to cold, acquire an accumulation of sensorial power during their inactivity; but this does not happen at all, or in much less quantity, from their quiescence after great expenditure of sensorial power by a previous excessive stimulus, as after intoxication. In this case the muscles or organs of sense gradually acquire their natural quantity of sensorial power, as after sleep; but not an accumulation or superabundance of it. And by frequent repetitions of exhaustion by great stimulus, these vessels cease to acquire their whole natural quantity of sensorial power; as in the scirrrous stomach, and scirrrous liver, occasioned by the great and frequent stimulus of vinous spirit; which may properly be termed irritative paralysis of those parts of the system.

In the same manner in common palsies the inaction of the paralytic muscle seems not to be owing to defect of the stimulus of the will, but to exhaustion of sensorial power. Whence it

frequently follows great exertion, as in Sect. XXXIV. 1. 7. Thus some parts of the system may cease to obey the will, as in common paralysis; others may cease to be obedient to sensation, as in the impotency of age; others to irritation, as in scirrhouis viscera; and others to association, as in impediment of speech; yet though all these may become inexcitable, or dead, in respect to that kind of stimulus, which has previously exhausted them, whether of volition, or sensation, or irritation, or association, they may still in many cases be excited by the others.

SPECIES.

1. *Lassitudo.* Fatigue or weariness after much voluntary exertion. From the too great expenditure of sensorial power the muscles are with difficulty brought again into voluntary contraction; and seem to require a greater quantity or energy of volition for this purpose. At the same time they still remain obedient to the stimulus of agreeable sensation, as appears in tired dancers finding a renovation of their aptitude to motion on the acquisition of an agreeable partner; or from a tired child riding on a gold-headed cane, as in Sect. XXXIV. 2. 6. These muscles are likewise still obedient to the sensorial power of association, because the motions when thus excited,

cited, are performed in their designed directions; and are not broken into variety of gesticulation, as in St. Vitus's dance.

A lassitude likewise frequently occurs with yawning at the beginning of ague-fits; where the production of sensorial power in the brain is less than its expenditure. For in this case the torpor may either originate in the brain, or the torpor of some distant parts of the system may by sympathy affect the brain, though in a less proportionate degree than the parts primarily affected.

2. *Vacillatio senilis.* Some elderly people acquire a see-saw motion of their bodies from one side to the other, as they sit, like the oscillation of a pendulum. By these motions the muscles, which preserve the perpendicularity of the body, are alternately quiescent, and exerted; and are thus less liable to fatigue or exhaustion. This therefore resembles the tremors of old people above mentioned, and not those spasmodic movements of the face or limbs, which are called tricks, described in Class IV. 3. 2. 2. which originate from excess of sensorial power, or from efforts to relieve disagreeable sensation, and are afterwards continued by habit.

3. *Tremor senilis.* Tremor of old age consists of a perpetual trembling of the hands, or of the

head, or of other muscles, when they are exerted; and is erroneously called paralytic; and seems owing to the small quantity of animal power residing in the muscular fibres. These tremors only exist when the affected muscles are excited into action, as in lifting a glass to the mouth, or in writing, or in keeping the body upright; and cease again, when no voluntary exertion is attempted, as in lying down. Hence these tremors evidently originate from the too quick exhaustion of the lessened quantity of the spirit of animation. So many people tremble from fear or anger, when too great a part of the sensorial power is exerted on the organs of sense, so as to deprive the muscles, which support the body erect, of their due quantity.

4. *Brachiorum paralyssis.* A numbness of the arms is a frequent symptom in hydrops thoracis, as explained in Class I. 2. 3. 14. and in Sect. XXIX. 5. 2.; it also accompanies the asthma dolorificum, Class III. 1. 1. 11. and is owing probably to the same cause in both. In the colica saturnina a paralyssis affects the wrists, as appears on the patient extending his arm horizontally with the palm downwards, and is often attended with a tumor on the carpal or metacarpal bones. See Class IV. 2. 2. 10. and I. 2. 4. 8.

Mr. M—, a miner and well-sinker, about three years ago, lost the power of contracting

both his thumbs ; the balls or muscles of the thumbs are much emaciated, and remain paralytic. He ascribes his disease to immersing his hands too long in cold water in the execution of his business. He says his hands had frequently been much benumbed before, so that he could not without difficulty clench them ; but that they recovered their motion, as soon as they began to glow, after he had dried and covered them.

In this case there existed two injurious circumstances of different kinds ; one the violent and continued action of the muscles, which destroys by exhausting the sensorial power ; and the other, the application of cold, which destroys by defect of stimulus. The cold seems to have contributed to the paralyis by its long application, as well as the continued exertion ; but as during the torpor occasioned by the exposure to cold, if the degree of it be not so great as to extinguish life, the sensorial power becomes accumulated ; there is reason to believe, that the exposing a paralytic limb to the cold for a certain time, as by covering it with snow or iced water for a few minutes, and then covering it with warm flannel, and this frequently repeated, might, by accumulation of sensorial power, contribute to restore it to a state of voluntary excitability. As this accumulation of sensorial power, and consequent glow, seem, in the present case, several times to have contributed to restore the numbness or inability of those

I 4 muscles,

muscles, which at length became paralytic. See Class I. 2. 3. 21.

M. M. Ether externally. Friction. Saline warm bath. Electricity. Mercurial ointment. See Class I. 2. 4. 8.

5. *Raucedo paralytica*. Paralytic hoarseness consists in the almost total loss of voice, which sometimes continues for months, or even years, and is occasioned by inability or paralysis of the recurrent nerves which serve the muscles of vocality, by opening or closing the larynx. The voice generally returns suddenly, even so as to alarm the patient. A young lady, who had many months been affected with almost a total loss of voice, and had in vain tried variety of advice, recovered her voice in an instant, on some alarm as she was dancing at an assembly. Was this owing to a greater exertion of volition than usual? like the dumb young man, the son of Crœsus, who is related to have cried out, when he saw his father's life endangered by the sword of his enemy, and to have continued to speak ever afterwards. Two young ladies in this complaint seemed to be cured by electric shocks passed through the larynx every day for a fortnight. See *Raucedo catarrhalis*, Class II. 1 3. 5.

M. M. An emetic. Electric shocks. Mustard-feed; a large spoonful swallowed whole, or a little bruised, every morning. Valerian. Burnt sponge. Blisters on each side of the larynx. Sea-bathing.

bathing. A gargle of decoction of seneca. Friction. Frequent endeavours to shout and sing.

6. *Vesicæ urinariae paralyſis.* Paralyſis of the bladder is frequently a symptom in irritative fever; in this case the patient makes no water for a day or two; and the tumor of the bladder distended with urine may be seen by the shape of the abdomen, as if girt by a cord below the navel, or distinguished by the hand. Many patients in this situation make no complaint, and suffer great injury by the inattention of their attendants; the water must be drawn off once or twice a day by means of a catheter, and the region of the bladder gently pressed by the hand, whilst the patient is kept in a sitting or erect posture. See Class II. 2. 2. 6.

M. M. Bark. Wine. Opium, a quarter of a grain every six hours. Balsam of copaiva or of Peru. Tincture of cantharides 20 drops twice a day, or repeated small blisters.

An inability to empty the bladder frequently occurs to elderly men, and is often fatal. This sometimes arises from their having too long been restrained from making water from accidental confinement in public society, or otherwise; whence the bladder has become so far distended as to become paralytic; and not only this, but the neck of the bladder has become contracted so as to resist the introduction of the catheter. In this

this deplorable case it has frequently happened, that the forcible efforts to introduce the catheter have perforated the urethra; and the instrument has been supposed to pass into the bladder, when it has only passed into the cellular membrane along the side of it; of which I believe I have seen two or three instances; and afterwards the part has become so much inflamed as to render the introduction of the catheter into the bladder impracticable.

In this situation the patients are in imminent danger, and some have advised a trocar to be introduced into the bladder from the rectum; which I believe is generally followed by an incurable ulcer. One patient, whom I saw in this situation, began to make a spoonful of water after six or seven days, and gradually in a few days emptied his bladder to about half its size, and recovered; but I believe he never afterwards was able completely to evacuate it.

In this situation I lately advised about two pounds of crude quicksilver to be poured down a glass tube, which was part of a barometer tube, drawn less at one end, and about two feet long, into the urethra, as the patient lay on his back; which I had previously performed upon a horse; this easily passed, as was supposed, into the bladder; on standing erect it did not return, but on kneeling down, and lying horizontally on his hands, the mercury readily returned; and on this account it was believed to have passed into the

the bladder, as it so easily returned, when the neck of the bladder was lower than the fundus of it. But nevertheless as no urine followed the mercury, though the bladder was violently distended, I was led to believe, that the urethra had been perforated by the previous efforts to introduce a catheter and bougee; and that the mercury had passed on the outside of the bladder into the cellular membrane.

As the urethra is so liable to be perforated by the forcible efforts to introduce the catheter, when the bladder is violently distended in this deplorable disease, I should strongly recommend the injection of a pound or two of crude mercury into the urethra to open by its weight the neck of the bladder previous to any violent or very frequent essays with a catheter whether of metal or of elastic resin.

7. *Recti paralysis.* Palsy of the rectum. The rectum intestinum, like the urinary bladder in the preceding article, possesses voluntary power of motion; though these volitions are at times uncontrollable by the will, when the acrimony of the contained feces, or their bulk, stimulates it to a greater degree. Hence it happens, that this part is liable to lose its voluntary power by *paralysis*, but is still liable to be stimulated into action by the contained feces. This frequently occurs in fevers, and is a bad sign as a symptom of general

general debility ; and it is the sensibility of the muscular fibres of this and of the urinary bladder remaining, after the voluntariness has ceased, which occasions these two reservoirs so soon to regain, as the fever ceases, their obedience to volition ; because the paralysis is thus shewn to be less complete in those cases than in common hemiplegia ; as in the latter the sense of touch, though perhaps not the sense of pain, is generally destroyed in the paralytic limb.

M.M. A sponge introduced within the sphincter ani to prevent the constant discharge, which should have a string put through it, by which it may be retracted.

8. *Paresis voluntaria.* Indolence ; or inaptitude to voluntary action. This debility of the exertion of voluntary efforts prevents the accomplishment of all great events in life. It often originates from a mistaken education, in which pleasure or flattery is made the immediate motive of action, and not future advantage ; or what is termed duty. This observation is of great value to those, who attend to the education of their own children. I have seen one or two young married ladies of fortune, who perpetually became uneasy, and believed themselves ill, a week after their arrival in the country, and continued so uniformly during their stay ; yet on their return to London or Bath immediately lost all their complaints,

complaints, and this repeatedly; which I was led to ascribe to their being in their infancy surrounded with menial attendants, who had flattered them into the exertions they then used. And that in their riper years, they became torpid for want of this stimulus, and could not amuse themselves by any voluntary employment; but required ever after, either to be amused by other people, or to be flattered into activity. This I suppose, in the other sex, to have supplied one source of ennui and suicide. See Class III. 1, 2. 11.

9. *Catalepsis* is sometimes used for fixed spasmic contractions or tetanus, as described in Sect. XXXIV. 1. 5. and in Class III. 1. 1. 13. but is properly simply an inaptitude to muscular motion, the limbs remaining in any attitude in which they are placed. One patient whom I saw in this situation, had taken much mercury, and appeared universally torpid. He sat in a chair in any posture he was put, and held a glass to his mouth for many minutes without attempting to drink, or withdrawing his hand. He never spoke, and it was at first necessary to compel him to drink broth; he recovered in a few weeks without relapse.

10. *Hemiplegia*. Palsy of one side consists in the total disobedience of the affected muscles to the

the power of volition. As the voluntary motions are not perpetually exerted, there is little sensorial power accumulated during their quiescence, whence they are less liable to recover from torpor, and are thus more frequently left paralytic, or disobedient to the power of volition, though they are sometimes still alive to painful sensation; as to the prick of a pin, and to heat; also to irritation, as in stretching and yawning; or to electric shocks. Where the paraly sis is complete the patient seems gradually to learn to use his limbs over again by repeated efforts, as in infancy; and, as time is required for this purpose, it becomes difficult to know, whether the cure is owing to the effect of medicines, or to the repeated efforts of the voluntary power.

The dispute, whether the nerves decussate or cross each other before they leave the cavities of the skull or spine, seems to be decided in the affirmative by comparative anatomy; as the optic nerves of some fish have been shewn evidently to cross each other; as seen by Haller, *Elem. Physiol.* t. v. p. 349. Hence the application of blisters or of ether, or of warm fomentations, should be on the side of the head opposite to that of the affected muscles. This subject should nevertheless be nicely determined, before any one should trepan for the hydrocephalus internus, when the disease is shewn to exist only on one side of the brain, by a squinting affecting but one eye;

as

as proposed in Class I. 2. 5. 4. Dr. Sommering has shewn, that a true decussation of the optic nerves in the human subject actually exists, *Elem. of Physiology* by Blumenbach, translated by C. Caldwell, Philadelphia. This further appears probable from the oblique direction and insertion of each optic nerve, into the side of the eye next to the nose, in a direct line from the opposite side of the brain.

The vomiting, which generally attends the attack of hemiplegia, is mentioned in Sect. XX. 8. and is similar to that attending vertigo in sea-sickness, and at the commencement of some fevers. Black stools sometimes attend the commencement of hemiplegia, which is probably an effusion of blood from the biliary duct, where the liver is previously affected; or some blood may be derived to the intestines by its escaping from the vena cava into the receptacle of chyle during the distresses of the paralytic attack; and may be conveyed from thence into the intestines by the retrograde motions of the lacteals; as probably sometimes happens in diabetes. See Sect. XXVII. 2. Palsy of one side of the face is mentioned in Class II. 1. 4. 6. Paralysis of the lacteals, of the liver, and of the veins, which are described in Sect. XXVIII. XXX. and XXVII. do not belong to this class, as they are not diseases of voluntary motions.

M. M. The electric sparks and shocks, if used early

early in the disease, are frequently of service. A purge of aloes, or calomel. A vomit. Blister. Saline draughts. Then the bark. Mercurial ointment or sublimate, where the liver is evidently diseased; or where the *gutta rosea* has previously existed. Sudden alarm. Frequent voluntary efforts. Externally ether. Volatile alkali. Fomentation on the head. Friction. When children, who have suffered a hemiplegia, begin to use the affected arm, the other hand should be tied up for half an hour three or four times a day; which obliges them at their play to use more frequent voluntary efforts with the diseased limb, and thus sooner to restore the disengaged associations of motion.

In hemiplegia, as well as toward the end of some fevers with great debility, the parts about the loins are liable to mortify by the pressure of a continued recumbency upon them, and in part by the friction of those parts against the sheet, as the patient slides down again after being frequently raised higher in his bed, to prevent which a pillow should be put beneath the under-sheet half way down the bed, as in Class II. 1. 2. 4. A solution of sugar of lead, or white lead in fine powder, or a cerate of lapis calaminaris contributes to heal or to prevent these excoriations. But the most efficacious preventive consists in the patient's wearing a pair of linen drawers; by which means, when he slides down in his bed,

bed, the friction will be between the sheet and his drawers, not between the sheet and his skin; and this greater friction will in general prevent his sliding down in bed, when his head and shoulders are raised on more pillows, which will on this account also contribute much to his comfort; this is also worthy the attention of those dropfical patients, who are necessitated to lie with the head raised high in bed.

When these patients have any difficulty of swallowing, they should be raised up when any fluid is put into the mouth, lest it should suffocate them. See Apoplexia, No. 16. Nor should young children be fed as they lie on their backs, as they are then obliged to swallow as much as the nurse pleases; like one of the punishments formerly used in the inquisition, where the delinquent was made to swallow many quarts of water, as he was chained down on his back, and was suffocated by it.

In paralysis of the wrists from lead, Mr. Clutterbuck has lately published some successful cases of the use of mercurial ointment. See Colica Saturnina, I. 2. 4. 8. See Class III. 2. 1. 4.

Dr. J. Alderson has lately much recommended the leaves of *rhus toxicodendron* (sumach), from i. gr. to iv. of the dried powder to be taken three or four times a day. *Essay on Rhus Toxic.* Johnson, London, 1793. But it is difficult to know what medicine is of service, as the move-

ments of the muscles must again be learned, as in infancy, by frequent efforts.

11. *Paraplegia.* A palsy of the lower half of the body divided horizontally. Animals may be conceived to have double bodies, one half in general resembling so exactly the other, and being supplied with separate sets of nerves; this gives rise to hemiplegia, or palsy of one half of the body divided vertically; but the paraplegia, or palsy of the lower parts of the system, depends on an injury of the spinal marrow, or that part of the brain which is contained in the vertebræ of the back; by which all the nerves situated below the injured part are deprived of their nutriment, or precluded from doing their proper offices; and the muscles, to which they are derived, are in consequence disobedient to the power of volition.

This sometimes occurs from an external injury, as a fall from an eminence; of which I saw a deplorable instance, where the bladder and rectum, as well as the lower limbs, were deprived of so much of their powers of motion, as depended on volition or sensation; but I suppose not of that part of it, which depends on irritation. In the same manner as the voluntary muscles in hemiplegia are sometimes brought into action by irritation, as in stretching or pandiculation, described in Sect. VII. 1. 3.

But

But the most frequent cause of paraplegia is from a protuberance of one of the spinal vertebræ; which is owing to the innutrition or softness of bones, described in Class I. 2. 2. 17. The cure of this deplorable disease is frequently effected by the stimulus of an issue placed on each side of the prominent spine, as first published by Mr. Pott. The other means recommended in softness of bones should also be attended to; both in respect to the internal medicines, and to the mechanical methods of supporting, or extending the spine; which last, however, in this case requires particular caution.

12. *Somnus.* In sleep all voluntary power is suspended, see Sect. XVIII. An unusual quantity of sleep is often produced by weakness. In this case small doses of opium, wine, and bark, may be given with advantage. For the periods of sleep, see Class IV. 2. 4. 1.

The subsequent ingenious observations on the frequency of the pulse, which sometimes occurs in sleep, are copied from a letter of Dr. Currie of Liverpool to the author.

" Though rest in general perhaps renders the healthy pulse slower, yet under certain circumstances the contrary is the truth. A full meal without wine or other strong liquor does not increase the frequency of my pulse, while I sit upright, and have my attention engaged. But if I

take a recumbent posture after eating, my pulse becomes more frequent, especially if my mind be vacant, and I become drowsy; and, if I slumber, this increased frequency is more considerable with heat and flushing.

“ This I apprehend to be a general truth. The observation may be frequently made upon children; and the restless and feverish nights experienced by many people after a full supper are, I believe, owing to this cause. The supper occasions no inconvenience, whilst the person is upright and awake; but, when he lies down and begins to sleep, especially if he does not perspire, the symptoms above mentioned occur. Which may be thus explained in part from your principles. When the power of volition is abolished, the other sensorial actions are increased. In ordinary sleep this does not occasion increased frequency of the pulse; but where sleep takes place during the process of digestion, the digestion itself goes on with increased rapidity. Heat is excited in the system faster than it is expended; and operating on the sensitive actions, it carries them beyond the limitation of pleasure, producing, as is common in such cases, increased frequency of pulse.

“ It is to be observed, that in speaking of the heat generated under these circumstances, I do not allude to any chemical evolution of heat from the food in the process of digestion. I doubt

doubt if this takes place to any considerable degree, for I do not observe that the parts incumbent on the stomach are increased in heat during the most hurried digestion. It is on some parts of the surface, but more particularly on the extremities of the body, that the increased heat excited by digestion appears, and the heat thus produced arises, as it should seem, from the sympathy between the stomach and the vessels of the skin. The parts most affected are the palms of the hands, and the soles of the feet. Even there the thermometer seldom rises above 97 or 98 degrees, a temperature not higher than that of the trunk of the body; but three or four degrees higher than the common temperature of these parts, and therefore producing an uneasy sensation of heat, a sensation increased by the great sensibility of the parts affected.

"That the increased heat excited by digestion in sleep is the cause of the accompanying fever, seems to be confirmed by observing, that if an increased expenditure of heat accompanies the increased generation of it (as when perspiration on the extremities or surface attends this kind of sleep) the frequent pulse and flushed countenance do not occur, as I know by experiment. If, during the feverish sleep already mentioned, I am awakened, and my attention engaged powerfully, my pulse becomes almost immediately slower, and the fever gradually subsides."

K 3

From

From these observations of Dr. Currie it appears, that, while in common sleep the actions of the heart, arteries, and capillaries, are strengthened by the accumulation of sensorial power during the suspension of voluntary action, and the pulse in consequence becomes fuller and slower; in the feverish sleep above described the actions of the heart, arteries, and capillaries, are quickened as well as strengthened by their consent with the increased actions of the stomach, as well as by the stimulus of the new chyle introduced into the circulation. For the stomach, and all other parts of the system, being more sensible and more irritable during sleep, Sect. XVIII. 15. and probably more ready to act from association, are now exerted with greater velocity as well as strength, constituting a temporary fever of the sensitive irritated kind, resembling the fever excited by wine in the beginning of intoxication; or in some people by a full meal in their waking hours. Sect. XXXV. 1.

On waking, this increased sensibility and irritability of the system ceases by the renewed exertions of volition; in the same manner as more violent exertions of volition destroy greater pains; and the pulse in consequence subsides along with the increase of heat; if more violent efforts of volition are exerted, the system becomes still less affected by sensation or irritation. Hence the fever and vertigo of intoxication are lessened

by

by intense thinking, Sect. XXI. 8 ; and insane people are known to bear the pain of cold and hunger better than others, Sect. XXXIV. 2. 5 ; and lastly, if greater voluntary efforts exist, as in violent anger or violent exercise, the whole system is thrown into more energetic action, and a voluntary fever is induced, as appears by the red skin, quickened pulse, and increase of heat; whence dropsies and fevers with debility are not unfrequently removed by insanity.

Hence the exertion of the voluntary power in its natural degree diminishes the increased sensibility, and irritability, and probably the increased associability, which occur during sleep; and thus reduces the frequency of the pulse in the feverish sleep after a full meal. In its more powerful state of exertion, it diminishes or destroys sensations and irritations, which are stronger than natural, as in intoxication, or which precede convulsions, or insanity. In its still more powerful degree, the superabundance of this sensorial power actuates and invigorates the whole moving system, giving strength and frequency to the pulse, and an universal glow both of colour and of heat, as in violent anger, or outrageous insanities.

If, in the feverish sleep above described, the skin becomes cooled by the evaporation of much perspirable matter, or by the application of cooler air, or thinner clothes, the actions of the cuta-

neous capillaries are lessened by defect of the stimulus of heat, which counteracts the increase of sensibility during sleep, and the pulsations of the heart and arteries become slower from the lessened stimulus of the particles of blood thus cooled in the cutaneous and pulmonary vessels. Hence the admission of cold air, or ablution with subtepid or with cold water, in fevers with hot skin, whether they be attended with arterial strength, or arterial debility, renders the pulse slower; in the former case by diminishing the stimulus of the blood, and in the latter by lessening the expenditure of sensorial power. See Suppl. I. 8. and 15.

13. *Incubus.* The night-mare is an imperfect sleep, where the desire of locomotion is vehement, but the muscles do not obey the will; it is attended with great uneasiness, a sense of suffocation, and frequently with fear. It is caused by violent fatigue, or drunkenness, or indigestible food, or lying on the back, or perhaps from many other kinds of uneasiness in our sleep, which may originate either from the body or mind.

Now as the action of respiration is partly voluntary, this complaint may be owing to the irritability of the system being too small to carry on the circulation of the blood through the lungs during sleep, when the voluntary power is suspended. Whence the blood may accumulate in them, and a painful oppression supervene; as in some

some hemorrhages of the lungs, which occur during sleep; and in patients much debilitated by fevers. See *Somnus interruptus*, Class I. 2. 1. 3. and I. 2. 1. 9.

Great fatigue with a full supper and much wine, I have been well informed by one patient, always produced this disease in himself to a great degree. Now the general irritability of the system is much decreased by fatigue, as it exhausts the sensorial power; and secondly, too much wine and stimulating food will again diminish the irritability of some parts of the system, by employing a part of the sensorial power, which is already too small, in digesting a great quantity of aliment; and in increasing the motions of the organs of sense in consequence of some degree of intoxication, whence difficulty of breathing may occur from the inirritability of the lungs, as in Class I. 2. 1. 3.

This explains an apparent paradox, why people who are feeble, digest their dinners best, if they lie down and sleep, as most animals do, when their stomachs are full. Yet many weak people sleep very uneasily after a large supper. If the debility of the patient be not very great, and the dinner he has taken, be moderate, the suspension of voluntary action during sleep prevents the expenditure of so much sensorial power, which may be employed on the actions of the stomach, and thus facilitate the digestive process. If the pa-

tient be further exhausted as in the evening, or his debility greater, and sleep ensues after a copious or stimulating supper, so much sensorial power will be exerted on the actions of the stomach for digestion, that the circulation of the blood through the lungs will be impeded from the diminished irritability to external stimuli, and the absence of volition, as in the incubus, and somnus interruptus.

M. M. To sleep on a hard bed with the head raised. Moderate supper. The bark. By sleeping on a harder bed the patient will turn himself more frequently, and not be liable to sleep too profoundly, or lie too long in one posture. To be awakened frequently by an alarm clock.

14. *Lethargus.* The lethargy is a slighter apoplexy. It is supposed to originate from universal pressure on the brain, and is said to be produced by compressing the spinal marrow, where there is a deficiency of the bone in the spina bifida. See Sect. XVIII. 20. Whereas in the hydrocephalus there is only a partial pressure of the brain; and probably in nervous fevers with stupor the pressure on the brain may affect only the nerves of the senses, which lie within the skull, and not those nerves of the medulla oblongata, which principally contribute to move the heart and arteries; whence in the lethargic or apoplectic stupor the pulse is slow as in sleep, whereas in nervous

nervous fever the pulse is very quick and feeble, and generally so in hydrocephalus.

In cases of obstructed kidneys, whether owing to the tubuli uriniferi being totally obstructed by calculous matter, or by their paralysis, a kind of drowsiness or lethargy comes on about the eighth or ninth day, and the patient gradually sinks. See Class I. 1. 3. 9.

15. *Syncope epileptica*, is a temporary apoplexy, the pulse continuing in its natural state, and the voluntary power suspended. This terminates the paroxysms of epilepsy.

When the animal power is much exhausted by the preceding convulsions, so that the motions from sensation as well as those from volition are suspended; in a quarter or half an hour the sensorial power becomes restored, and if no pain, or irritation producing pain, recurs, the fit of epilepsy ceases; if the pain recurs, or the irritation, which used to produce it, a new fit of convolution takes place, and is succeeded again by a syncope. See Epilepsy, Class III. 1. 1. 7.

16. *Apoplexia*. Apoplexy may be termed an universal palsy, or a permanent sleep. In which, where the pulse is weak, copious bleeding must be injurious; as is well observed by Dr. Heberden, *Trans. of the College*.

Mr. —, about 70 years of age, had an apoplectic

plectic seizure. His pulse was strong and full. One of the temporal arteries was opened, and about ten ounces of blood suddenly taken from it. He seemed to receive no benefit from this operation; but gradually sunk, and lived but a day or two.

If apoplexy arises from the pressure of blood extravasated on the brain, one moderate venesection may be of service to prevent the further effusion of blood; but copious venesection must be injurious by weakening the patient; since the effused blood must have time, as in common vices or bruises, to undergo a chemico-animal process, so to change its nature as to fit it for absorption; which may take two or three weeks, which time a patient weakened by repeated venesection or arteriotomy may not survive.

Mrs. ——, about 40 years old, had an apoplectic seizure after great exertion from fear; she had lain about 24 hours without speech, or having swallowed any liquid. She was then forcibly raised in bed, and a spoonful of solution of aloes in wine put into her mouth, and the end of the spoon withdrawn, that she might more easily swallow the liquid.—This was done every hour, with broth, and wine and water intervening, till evacuations were procured; which with other means had good effect, and she recovered, except that a considerable degree of hemiplegia remained, and some imperfection of her speech.

Many people, who have taken so much virous spirit

spirit as to acquire the temporary apoplexy of intoxication, and are not improperly said to be dead-drunk, have died after copious venesection, I suppose in consequence of it. I once saw at a public meeting two gentlemen in the drunken apoplexy; they were totally insensible with low pulse, on this account they were directed not to lose blood, but to be laid on a bed with their heads high, and to be turned every half hour; as soon as they could swallow, warm tea was given them, which evacuated their stomachs, and they gradually recovered, as people do from less degrees of intoxication.

M. M. Cupping on the occiput. Venesection once in moderate quantity. Warm fomentations long continued and frequently repeated on the shaved head. Solution of aloes. Clysters with solution of aloes and oil of amber. A blister on the spine. An emetic. Afterwards the bark, and small doses of chalybeates. Small electric shocks through the head. Errhines. If small doses of opium? mercurial ointment rubbed on the head or neck?

Where there is a difficulty of swallowing in apoplectic or paralytic patients, or in those near death in fevers, or other diseases, no fluid should be put into their mouths as they lie upon their backs, lest it should choke them; but they should be raised and supported upright in their beds, and stimulated by strong light, and spoken to

to in a louder voice, desiring them to swallow, as the fluid is put into the mouth, and the spoon should be immediately withdrawn, that they may close their mouths. Hence if they cannot swallow, it will flow out of their mouths, and not endanger suffocating them. See Hemiplegia, Spec. 10, of this genus.

17. *Mors a frigore.* Death from cold. The unfortunate travellers, who almost every winter perish in the snow, are much exhausted by their efforts to proceed on their journey, as well as benumbed by cold. And as much greater exercise can be borne without fatigue in cold weather than in warm; because the excessive motions of the cutaneous vessels are thus prevented, and the consequent waste of sensorial power; it may be inferred, that the fatigued traveller becomes paralytic from violent exertion as well as by the application of cold.

Great degrees of cold affect the motions of those vessels most, which have been generally excited into action by irritation; for when the feet are much benumbed by cold, and painful, and at the same time almost insensible to the touch of external objects, the voluntary muscles retain their motions, and we continue to walk on; the same happens to the fingers of children in throwing snow-balls, the voluntary motions of

of the muscles continue, though those of the cutaneous vessels are benumbed into inactivity.

Mr. Thompson, an elderly gentleman of Shrewsbury, was seized with hemiplegia in the cold bath; which I suppose might be owing to some great energy of exertion, as much as to the coldness of the water. As in the instance given of Mr. Nairn, who, by the exertion to save his relation, perished himself. See Sect. XXXIV. 1. 7.

Whence I conclude, that, though heat is a fluid necessary to muscular motion, both perhaps by its stimulus, and by its keeping the minute component parts of the ultimate fibrils of the muscles or organs of sense at a proper distance from each other; yet paralysis, properly so called, is the consequence of exhaustion of sensorial power by exertion. And that the accumulations of it during the torpor of the cutaneous vessels by exposure to cold, or of some internal viscus in the cold fits of agues, are frequently instrumental in recovering the use of paralytic limbs, or of the motions of other paralytic parts of the system. See Spec. 4. of this genus.

Animal bodies resist the power of cold probably by their exertions in consequence of the pain of cold, see Botan. Gard. V. 1. additional note xii. But if these increased exertions be too violent, so as to exhaust the sensorial power in producing unnecessary motions, the animal will probably sooner perish. Thus a moderate quantity of

wine

wine or spirit repeated at proper intervals of time might be of service to those, who are long exposed to excessive cold, both by increasing the action of the capillary vessels, and thus producing heat, and perhaps by increasing in some degree the secretion of sensorial power in the brain. But the contrary must happen when taken immoderately, and not at due intervals. A well-attested history was once related to me of two men, who set out on foot to travel in the snow, one of whom drank two or three glasses of brandy before they began their journey, the other contented himself with his usual diet and potion; the former of whom perished in spite of any assistance his companion could afford him; and the other performed his journey with safety. In this case the sensorial power was exhausted by the unnecessary motions of incipient intoxication by the stimulus of the brandy, as well as by the exertions of walking; which so weakened the dram-drinker, that the cold sooner destroyed him; that is, he had not power to produce sufficient muscular or arterial action, and in consequence sufficient heat, to supply the great expenditure of it. Hence the capillaries of the skin first ceased to act, and became pale and empty; next those which are immediately associated with them, as the extremities of the pulmonary artery, as happens on going into the cold bath. By the continued inaction of these parts of the vascular

vascular system the blood becomes accumulated in the internal arteries, and the brain is supposed to be affected by its compression ; because these patients are said to sleep, or to become apoplectic, before they die. I overtook a fishman asleep on his panniers on a very cold frosty night, but on waking him he did not appear to be in any degree of stupor. See Class I. 2. 2. 1.

When travellers are benighted in deep snow, they might frequently be saved by covering themselves in it, except a small aperture for air ; in which situation the lives of hares, sheep, and other animals, are so often preserved. The snow, both in respect to its component parts, and to the air contained in its pores, is a bad conductor of heat, and will therefore well keep out the external cold ; and as the water, when part of it dissolves, is attracted into the pores of the remainder of it, the situation of an animal beneath it is perfectly dry ; and, if he is in contact with the earth, he is in a degree of heat between 48, the medium heat of the earth, and 32, the freezing point ; that is, in 40 degrees of heat, in which a man thus covered will be as warm as in bed. See Botan. Garden, V. II. notes on Anemone, Barometz, and Muscus. If these facts were more generally understood, it might annually save the lives of many.

After any part of the vascular system of the body has been long exposed to cold, the senso-

rial power is so much accumulated in it, that on coming into a warm room the pain of hotach is produced, and inflammation, and consequent mortification, owing to the great exertion of those vessels, when again exposed to a moderate degree of warmth. See Sect. XII. 5. Whence the propriety of applying but very low degrees of heat to limbs benumbed with cold at first, as of snow in its state of dissolving, which is at 32 degrees of heat, or of very cold water. A French writer has observed, that if frozen apples be thawed gradually by covering them with thawing snow, or immersing them in very cold water, they do not lose their taste; if this fact was well ascertained, it might teach us how to preserve other ripe fruits in ice-houses for winter consumption. See Suppl. I. 14. 3.

The pain of cold is probably owing to the accumulation of the sensorial power of irritation. As the skins of those, who have been constantly stimulated into great action by external heat, must soon possess an accumulation of that sensorial power, when the stimulus of heat is withdrawn. See tedium vitæ from accumulation of the sensorial power of volition. III. 1. 2. 11.

ORDO

ORDO II.

Decreased Volition.

GENUS II.

With decreased Actions of the Organs of Sense.

SPECIES.

1. *Recollectionis jactura.* Loss of recollection. This is the defect of memory in old people, who forget the actions of yesterday, being incapable of voluntary recollection, and yet remember those of their youth, which by frequent repetition are introduced by association or suggestion. This is properly the paralysis of the mind; the organs of sense do not obey the voluntary power; that is, our ideas cannot be recollected, or acted over again by the will.

After an apoplectic attack the patients, on beginning to recover, find themselves most at a loss in recollecting proper names of persons or places; as those words have not been so frequently associated with the ideas they stand for, as the common words of a language. Mr. —, a man of strong mind, of a short-necked family, many of whom had suffered by apoplexy, after an apoplectic fit, on his recovering the use of speech, after repeated trials to remember the

name of a person or place, applauded himself, when he succeeded, with such a childish smile on the partial return of his sagacity, as very much affected me.—Not long, alas! to return; for another attack in a few weeks destroyed the whole. See Class IV. 2. 3. 8.

I saw a child after the small-pox, which was left in this situation; it was lively, active, and even vigorous; but shewed that kind of surprise, which novelty excites, at every object it viewed; and that as often as it viewed it. I never heard the termination of the case.

2. *Stultitia voluntaria.* Voluntary folly. The absence of voluntary power and consequent incapacity to compare the ideas of present and future good. Brute animals may be said to be in this situation, as they are in general excited into action only by their present painful or pleasurable sensations. Hence though they are liable to surprise, when their passing trains of ideas are differered by violent stimuli; yet are they not affected with wonder or astonishment at the novelty of objects; as they possess but in a very inferior degree, that voluntary power of comparing the present ideas with those previously acquired, which distinguishes mankind; and is termed analogical reasoning, when deliberatively exerted; and intuitive analogy, when used without our attention to it, and which always preserves our hourly trains

trains of ideas consistent with truth and nature.
See Sect. XVII. 3. 7.

3. *Ratioceanatio verboſa.* Verbal reasoning. This arises from the feeble or inaccurate exertions of the faculty of volition in the act of recalling the ideas of things, and thus mistaking the ideas of words for them. One great imperfection of language consists in the use of what Mr. Horne Tooke calls general terms, as mentioned in Sect. XV. 1. 5. and Sect. XVI. 17. of this work, and which Mr. Locke supposed to express abstracted or general ideas, such as the word castle or army, which in common conversation includes any part or property of those complex things, and is thus liable to mislead inaccurate thinkers. Thus it was said last night, "That horse strikes fire as he passes along the pavement." And it was added jocularly, "that his feet must be as hard as iron," which mistake might arise from the general term, horse, including in common conversation both every part of the animal and his accoutrements.

A second source of false reasoning may arise from the same word having two significations totally different from each other; which may mislead those who reason from ideas of words instead of ideas of things. These are generally esteemed witticisms, and are called puns or quibbles; as the jocular syllogism on the word spirit.

“ Brandy is a spirit; the Devil is a spirit; therefore brandy is the devil.”

A third source of false reasoning is derived from the two-fold meaning of some sentences, or phrases in all languages; this is also used designedly in jocular compositions, and constitutes the wit of some comedies. An old miller riding on his sack of flour was accosted by two young Cantabs, who rode on each side of him, with “ Gentlemen of your profession have sometimes a doubtful character—pray, miller, do you think yourself more knave or fool?” the witty miller answered, looking first at one of them and then at the other, “ I think myself at present between both.” This double entendre of a sentence was used by the priests of the ancient oracles to deceive the inquirer into future events. As that of

Aio te, Æacide, Romanos vincere posse.

I say, that you, Æacides, the Romans shall conquer.

There is a fourth mode of verbose ratiocination, which consists in the conclusion of the syllogism containing an imaginary, but not even a verbal analogy to the preceding propositions. Thus a rustic devotee said to his priest, “ I have often wondered, why God Almighty called the first man Adam?” “ Don’t you know,” replied the teacher, “ that A is the first letter of the alphabet?”

phabet?" "Aye, so it is," answered the contented inquirer.

Another kind of false reasoning is called by logicians a logical vice; and another kind arises from the first proposition being untrue in respect to its existence: but as all these, and perhaps many other sources of false reasonings, may be resolved into the mistaken use of ideas of words, or general terms, instead of ideas of the things, or parts of things, which they ought to suggest; they belong properly to this article of *ratiocinatio verboſa*: while the rare faculty of reasoning without words by comparing ideas of things, as in the invention of new machines, and other new discoveries, distinguishes the philosopher from the sophist.

M. M. Children should be permitted to use their hands early in their infancy, and should be supplied with pencils, pens, and various tools; by which they will acquire accurate ideas of external things by the organ of touch, at the same time that they acquire words; and will thence be less liable to be seriously deceived by general terms, or by the double meanings of words, or of sentences, or lastly by false propositions or inconclusive deductions; and will thus be enabled to compare the analogies of things, and to think without words; the faculty, which constitutes genius, and which so few possess!

4. *Credulitas.* Credulity. Life is short, opportunities of knowledge rare; our senses are fallacious, our reasonings uncertain, man therefore struggles with perpetual error from the cradle to the coffin. He is necessitated to correct experiment by analogy, and analogy by experiment; and not always to rest satisfied in the belief of facts even with this two-fold testimony, till future opportunities, or the observations of others, concur in their support.

Ignorance and credulity have ever been companions, and have misled and enslaved mankind; philosophy has in all ages endeavoured to oppose their progress; and to loosen the shackles they had imposed; philosophers have on this account been called unbelievers: unbelievers of what? of the fictions of fancy, of witchcraft, hobgoblins, apparitions, vampires, fairies; of the influence of stars on human actions, miracles wrought by the bones of saints, the flights of ominous birds, the predictions from the bowels of dying animals, expounders of dreams, fortunetellers, conjurors, modern prophets, necromancy, cheiromancy, animal magnetism, metallic tractors, with endless variety of folly? These they have disbelieved and despised, but have ever bowed their hoary heads to Truth and Nature.

Mankind may be divided in respect to the facility of their belief or conviction into two classes; those, who are ready to assent to single facts

facts from the evidence of their senses, or from the serious assertions of others; and those, who require analogy to corroborate or authenticate them.

Our first knowledge is acquired by our senses; but these are liable to deceive us, and we learn to detect these deceptions by comparing the ideas presented to us by one sense with those presented by another. Thus when we first view a cylinder, it appears to the eye as a flat surface with different shades on it, till we correct this idea by the sense of touch, and find its surface to be circular; that is, having some parts gradually receding further from the eye than others. So when a child, or a cat, or a bird, first sees its own image in a looking-glass, it believes that another animal exists before it, and detects this fallacy by going behind the glass to examine, if another tangible animal really exists there.

Another exuberant source of error consists in the false notions, which we receive in our early years from the design or ignorance of our instructors, which affect all our future reasoning by their perpetual intrusions; as those habits of muscular actions of the face or limbs, which are called tricks, when contracted in infancy continue to the end of our lives.

A third great source of error is the vivacity of our ideas of imagination, which perpetually intrude themselves by various associations, and compose

compose the farrago of our dreams; in which, by the suspension of volition, we are precluded from comparing the ideas of one sense with those of another, or the incongruity of their successions with the usual course of nature, and thus to detect their fallacy. Which we do in our waking hours by a perpetual voluntary exertion, a process of the mind above mentioned, which we have termed intuitive analogy. Sect. XVII.

3. 7.

This analogy presupposes an acquired knowledge of things, hence children and ignorant people are the most credulous, as not possessing much knowledge of the usual course of nature; and secondly, those are most credulous, whose faculty of comparing ideas, or the voluntary exertion of it, is slow or imperfect. Thus if the power of the magnetic needle of turning towards the north, or the shock given by touching both sides of an electrized coated jar, was related for the first time to a philosopher, and to an ignorant person; the former would be less ready to believe them, than the latter; as he would find nothing similar in nature to compare them to, he would again and again repeat the experiment, before he would give it his entire credence; till by these repetitions it would cease to be a single fact, and would therefore gain the evidence of analogy. But the latter, as having less knowledge of nature, and less facility of voluntary exertion,

exertion, would more readily believe the assertions of others, or a single fact, as presented to his own observation. Of this kind are the bulk of mankind; they continue throughout their lives in a state of childhood, and have thus been the dupes of priests and politicians in all countries and in all ages of the world.

In regard to religious matters, there is an intellectual cowardice instilled into the minds of the people from their infancy; which prevents their inquiry: credulity is made an indispensable virtue; to inquire or exert their reason in religious matters is denounced as sinful; and in the catholic church is punished with more severe penances than moral crimes. But in respect to our belief of the supposed medical facts, which are published by variety of authors; many of whom are ignorant, and therefore credulous; the golden rule of David Hume may be applied with great advantage. "When two miraculous assertions oppose each other, believe the less miraculous." Thus if a person is said to have received the small-pox a second time, and to have gone through all the stages of it, one may thus reason: twenty thousand people have been exposed to the variolous contagion a second time without receiving the variolous fever, to every one who has been said to have thus received it; it appears therefore less miraculous, that the assertor of this supposed fact has been deceived, or wishes

to deceive, than that it has so happened contrary to the long experienced order of nature.

M. M. The method of cure is to increase our knowledge of the laws of nature, and our habit of comparing whatever ideas are presented to us with those known laws, and thus to counteract the fallacies of our senses, to emancipate ourselves from the false impressions, which we have imbibed in our infancy, and to set the faculty of reason above that of imagination.

The

The Orders and Genera of the Fourth Class of Diseases.

CLASS IV.

DISEASES OF ASSOCIATION.

ORDO I.

Increased Associate Motions.

GENERA.

1. Catenated with irritative motions.
2. Catenated with sensitive motions.
3. Catenated with voluntary motions.
4. Catenated with external influences.

ORDO II.

Decreased Associate Motions.

GENERA.

1. Catenated with irritative motions.
2. Catenated with sensitive motions.
3. Catenated with voluntary motions.
4. Catenated with external influences.

ORDO III.

Retrograde Associate Motions.

GENERA.

1. Catenated with irritative motions.
2. Catenated with sensitive motions.
3. Catenated with voluntary motions.
4. Catenated with external influences.

The

*The Orders, Genera, and Species, of the Fourth
Class of Diseases.*

CLASS IV.

DISEASES OF ASSOCIATION.

ORDO I.

Increased Associate Motions.

GENUS I.

Catarrated with Irritative Motions.

SPECIES.

1. *Rubor vultus pranso- rum.* Flushing of the face after dinner.
2. *Sudor stragulis immer- forum.* Sweat from covering the face in bed.
3. *Cessatio ægritudinis cute excitata.* Cure of sickness by stimulating the skin.
4. *Digestio aucta frigore cutaneo.* Digestion increased by coldness of the skin.
5. *Catarrhus a frigore cutanèo.* Catarrh from cold skin.
6. *Absorptio cellularis aucta vomitu.* Cellular absorption increased by vomiting.
7. *Singultus nephriticus.* Nephritic hiccough.
8. *Febris irritativa.* Irritative fever.

GENUS

GENUS II.

Catenated with Sensitive Motions.

SPECIES.

1. *Lacrymarum fluxus sympatheticus*. Sympathetic tears.
2. *Sternutatio a lumine*. Sneezing from light.
3. *Dolor dentium a Ritudine*. Tooth-edge from grating sounds.
4. *Risus sardonicus*. Sardonic smile.
5. *Salivæ fluxus cibo viso*. Flux of saliva at sight of food.
6. *Tensio mamillarum viso puerulo*. Tension of the nipples of lactescent women at sight of the child.
7. *Tensio penis in hydrophobia*. Tension of the penis in hydrophobia.
8. *Tenesmus calculosus*. Tenesmus from stone.
9. *Polypus narium ex ascaride*. Polypus of the nose from ascarides.
10. *Crampus furarum in diarrhœa*. Cramp from diarrhoea.
11. *Zona ignea nephritica*. Nephritic shingles.
12. *Eruptio variolarum*. Eruption of small pox.
13. *Gutta rosea stomatica*. Stomatic rosy drop.
14. *— hepatica*. Hepatic rosy drop.
15. *Podugra*. Gout.
16. *Rheumatismus*. Rheumatism.
17. *Erysipelas*. Erysipelas.
18. *Tetsum*

18. *Testium tumor in go-* Swelled testis in go-
norrhœa. norrhœa.

19. *————— in pa-* *————— in mumps.*
rotitide.

GENUS III.

Catenated with voluntary Motions.

SPECIES.

1. *Deglutitio invita.* Involuntary deglutition.
2. *Nititatio invita.* *————— nititation.*
3. *Risus invitus.* *————— laughter.*
4. *Lusus digitorum invitus.* *————— actions with*
the fingers.
5. *Unguim morsuncula* *————— biting the*
invita. *nails.*
6. *Vigilia invita.* *————— watchfulness.*

GENUS IV.

Catenated with External Influences.

SPECIES.

1. *Vita ovi.* Life of an egg.
2. *Vita hiemi-dormientium.* Life of winter-sleepers.
3. *Pullulatio arborum.* Budding of trees.
4. *Orgasmatis venerei per-*
riodus. Periods of venereal de-
fire.
5. *Brachii concusso elec-*
trica. Electric shock through
the arm.
6. *Oxygenatio sanguinis.* Oxygenation of the
blood.
7. *Humectatio corporis.* Humection of the
body.

ORDO

ORDO II.

Decreased Associate Motions.

GENUS I.

Catenated with Irritative Motions.

SPECIES.

1. <i>Cutis frigida pranso-</i>	Chillness after dinner, rum.
2. <i>Pallor urinae pranso-</i>	Pale urine after dinner. rum.
3. —— <i>a frigore cutaneo.</i>	—— from cold skin.
4. <i>Pallor ex aegritudine.</i>	Paleness from sickness.
5. <i>Dyspnoea a balneo frigido.</i>	Shortness of breath from cold bathing
6. <i>Dyspepsia a pedibus frigidis.</i>	Indigestion from cold feet.
7. <i>Tussis a pedibus frigidis.</i>	Cough from cold feet.
8. —— <i>hepatica.</i>	Liver-cough.
9. —— <i>arthritica.</i>	Gout-cough.
10. <i>Vertigo rotatoria.</i>	Vertigo rotatory.
11. —— <i>visualis.</i>	—— visual.
12. —— <i>ebriosa.</i>	—— inebriate.
13. —— <i>febriculosa.</i>	—— feverish.
14. —— <i>cerebrosa.</i>	—— from the brain.

15. *Murmur aurium vertiginosum.* Noise in the ears.

16. *Tactus, gustus, olfactus vertiginosi.* Vertiginous touch, taste, smell.

17. *Pulsus mollis a vomitione.* Soft pulse in vomiting.

18. *— intermittens a ventriculo.* Intermittent pulse from the stomach.

19. *Febris inirritativa.* Inirritative fever.

GENUS II.

Catenated with Sensitive Motions.

SPECIES.

1. *Torpor genæ a dolore dentis.* Coldness of the cheek from tooth-ach.

2. *Stranguria a dolore vesicæ.* Strangury from pain of the bladder.

3. *— convulsiva.* Convulsive strangury.

4. *Dolor termini ductus choledochi.* Pain of the end of the bile-duct.

5. *Dolor pharyngis ab acido gastrico.* Pain of the throat from gastric acid.

6. *Pruritus narium a vermibus.* Itching of the nose from worms.

7. *Cephalæa.* Head-ach.

8. *Hemicrania et otalgia.* Partial head-ach, and ear-ach.

9. *Dolor*

9. *Dolor humeri in hepaticide.* Pain of shoulder in hepaticis.

10. *Torpor pedum variolae erumpente* Cold feet in eruption of small-pox.

11. *Testium dolor nephriticus.* Nephritic pain of testis.

12. *Dolor digiti minimi sympatheticus.* Pain of little finger from sympathy.

13. *Dolor brachii in hydrope pectoris.* Pain of the arm in dropy of the chest.

14. *Diarrhœa a dentitione.* Diarrhœa from toothing.

GENUS III.

Catenated with Voluntary Motions.

SPECIES.

1. *Titubatio linguae.* Impediment of speech.

2. *Chorea sancti Viti.* St. Vitus' dance.

3. *Risus.* Laughter.

4. *Tremore ex ira.* Trembling from anger.

5. *Rubor ex ira.* Redness from anger.

6. — *criminati.* Blush of guilt.

7. *Tarditas paralytica.* Slowness from palsy.

8. — *senilis.* —— of age.

GENUS IV.

Catenated with External Influences.

SPECIES.

1. *Somni periodus.* Periods of sleep.
2. *Studii inanis periodus.* —— of reverie.
3. *Hemicraniae periodus.* —— of head-ach.
4. *Epilepsiae dolorificae periodus.* —— of painful epilepsy.
5. *Convulsionis dolorificae periodus.* —— of painful convulsion.
6. *Tussis periodicæ periodus.* —— of periodic cough.
7. *Catameniae periodus.* —— of catamenia.
8. *Hæmorrhoidis periodus.* —— of the piles.
9. *Podagræ periodus.* —— of the gout.
10. *Erysipelatis periodus.* —— of erysipelas.
11. *Febrium periodus.* —— of fevers.

ORDO III.-

Retrograde Associate Motions.

GENUS I.

Catenated with Irritative Motions.

SPECIES.

1. *Diabetes irritata.* Diabetes from irritation.
2. *Sudor*

2. *Sudor frigidus in asth-* Cold sweat in asthma.
mate.

3. *Diabetes a timore.* Diabetes from fear.

4. *Diarrhœa a timore.* Diarrhœa from fear.

5. *Pallor et tremor a ti-* Paleness and trembling
more. from fear.

6. *Palpitatio cordis a ti-* Palpitation of the heart
more. from fear.

7. *Abortio a timore.* Abortion from fear.

8. *Hysteria a timore.* Hysterics from fear.

GENUS II.

Catenated with Sensitive Motions.

SPECIES.

1. *Nausea idealis.* Nausea from ideas.

2. —— *a conceptu.* Nausea from conception.

3. *Vomitio vertiginosa.* Vomiting from vertigo.

4. —— *a calculo in* —— from stone in
uretere. the ureter.

5. —— *ab insultu pa-* —— from stroke
ralytico. of palsy.

6. —— *a titillatione* —— from tickling
faucium. the throat.

7. —— *cute sympathet-* —— from sympa-
tica. thy with the skin.

GENUS III.

Catenated with Voluntary Motions.

SPECIES.

1. <i>Ruminatio.</i>	Rumination.
2. <i>Vomitio voluntaria.</i>	Voluntary vomiting.
3. <i>Eructatio voluntaria.</i>	——— eructation.

GENUS IV.

Catenated with External Influences.

SPECIES.

1. <i>Catarrhus periodicus.</i>	Periodical catarrh.
2. <i>Tussis periodica.</i>	Periodic cough.
3. <i>Hysteria a frigore.</i>	Hysterics from cold.
4. <i>Nausea pluvialis.</i>	Sickness against rain.

CLASS

CLASS IV.

DISEASES OF ASSOCIATION.

ORDO I.

Increased Associate Motions.

GENUS I.

Catenated with Irritative Motions.

THE importance of the subsequent class not only consists in its elucidating all the sympathetic diseases, but in its opening *a road to the knowledge of fever*. The difficulty and novelty of the subject must plead in excuse for the present imperfect state of it. The reader is entreated previously to attend to the following circumstances for the greater facility of investigating their intricate connections; which I shall enumerate under the following heads.

- A. Associate motions distinguished from catenations.
- B. Associate motions of three kinds.
- C. Associations affected by external influences.
- D. Associations affected by other sensorial motions.
- E. Associations catenated with sensation.

M 4

F. Direct

- F. Direct and reverse sympathy.
- G. Associations affected four ways.
- H. Origin of associations.
- I. Of the action of vomiting.
- K. Tertian associations.

A. Associate Mations distinguished from Catenations.

Associate motions properly mean only those, which are caused by the sensorial power of association. Whence it appears, that those fibrous motions, which constitute the introductory link of an associate train of motions, are excluded from this definition, as not being themselves caused by the sensorial power of association, but by irritation, or sensation, or volition. I shall give for example the flushing of the face after dinner; the capillary vessels of the face increase their actions in consequence of their catenation, not their association, with those of the stomach; which latter are caused to act with greater energy by the irritation excited by the stimulus of food. These capillaries of the face are associated with each other reciprocally, as being all of them excited by the sensorial power of association; but they are only catenated with those of the stomach, which are not in this case associate motions but irritative ones. The common use of the word association for almost every kind of connection has

has rendered this subject difficult; from which inaccuracy I fear some parts of this work are not exempt.

B. *Associate Motions of three Kinds.*

Those trains or tribes of associate motions, the introductory links of which consists of an irritative motion, are termed irritative associations; as when the muscles of the eyelids close the eye in common nictitation. Those, whose introductory link consists of a sensitive motion, are termed sensitive associations; as when the pectoral and intercostal muscles act in sneezing. And lastly, those whose introductory link consists of a voluntary motion, are termed voluntary associations; as when the muscles of the lower limbs act in concert with those of the arm in fencing.

C. *Associations affected by external Influences.*

Circles of associate motions, as well as trains and tribes of them, are liable to be affected by external influences, which consist of ethereal fluids, and which, by penetrating the system, act upon it perhaps rather as a *causa sine qua non* of its movements, than directly as a stimulus; except when they are accumulated in unusual quantity. We have a sense adapted to the perception of the excess or defect of one of these fluids; I mean that of elementary heat; in which all things are immersed. See Class IV. I. 4. 1.

But

But there are others of them, which as we have no power to evade their influence, so we have no sense to perceive it; these are the solar, and lunar, and terrestrial gravitation, in which also all things are immersed; the electric aura, which pervades us, and is perpetually varying. See Class IV. I. 4. 5; the magnetic fluid, Class IV. I. 4. 6; and lastly, the great life-preserved oxygen gas, and the aqueous vapour of the atmosphere, see Class IV. I. 4. 6. and 7. and 2.

Of these external influences those of heat, and of gravity, have diurnal periods of increase and decrease; besides their greater periods of monthly or annual variation. The manner in which they act by periodical increments on the system, till some effect is produced, is spoken of in Sect. XXXII. 3. and 6.

D. Associations affected by other Sensorial Motions.

Circles and trains of associate motions are also liable to be affected by their catenations with other sensorial powers, as of irritation, or sensation, or volition; which other sensorial powers either thus simply form some of the links of the catenation, or add to the energy of the associated motions. Thus when vomiting is caused by the stimulus of a stone in the ureter, the sensation of pain seems to be a link of the catenation rather than an efficient cause of the vomiting. But when the capillary vessels of the skin increase their action from

from the influence of external heat, they are excited both by the stimulus of unusual heat, as well as by the stimulus of the blood, and by their accustomed association with the actions of the heart and arteries. And lastly, in the blush of anger the sensorial power of volition is added to that of association, and irritation, to excite the capillaries of the face with increased action. See Class IV. 2. 3. 5.

E. Associations catenated with Sensation.

Pain frequently accompanies associate trains or circles of motion without its being a cause, or a link, of them, but simply an attendant symptom; though it frequently gives name to the disease, as head-ach. Thus in the cramp of the calves of the legs in diarrhoea, the increased sensorial power of association is the proximate cause; the preceding increased action of the bowels is the remote cause; and the proximate effect is the violent contractions of the musculi gastrocnemii; but the pain of these muscles is only an attendant symptom, or a remote effect. See Sect. XVIII. 15. Other sensitive associations are mentioned in Class IV. 1. 2. and IV. 1. 2. 15.

Thus, if the flushing of the face above mentioned after dinner be called a disease, the immediate or proximate cause is the increased power of association, the remote cause is the increased

irritative

irritative motions of the stomach in consequence of the stimulus of food and wine. The disease or proximate effect consists in the increased actions of the cutaneous vessels of the face; and the sensation of heat, the existence of heat, and the red colour, are attendants or symptoms, or remote effects, of the increased actions of these cutaneous vessels.

F. Direct and reverse Sympathy.

The increased actions of the primary part of the trains of associated motions are sometimes succeeded by increased actions of the secondary part of the train; and sometimes by decreased actions of it. So likewise the decreased actions of the primary part of a train of associate motions are sometimes succeeded by decreased actions of the secondary part, and sometimes by increased actions of it. The former of these situations is called direct sympathy, and the latter reverse sympathy. In general I believe, where the primary part of the train of associated motions is exerted more than natural, it produces direct sympathy in strong people, and reverse sympathy in weak ones, as a full meal makes some people hot, and others chill. And where the primary part of the train is exerted less than natural, it produces direct sympathy in weak people, and reverse sympathy in strong ones, as

on

on being exposed for a certain length of time on horseback in a cold day gives indigestion and consequent heart-burn to weak people, and strengthens the digestion, and induces consequent hunger in strong ones. See Sect. XXXV. 1.

This may perhaps be more easily understood, by considering strength and weakness, when applied to animal bodies, as consisting in the quantity of sensorial power residing in the contracting fibres, and the quantity of stimulus applied, as shewn in Sect. XII. 2. 1. Now when defective stimulus, within certain limits, is partially applied to parts subject to perpetual motion, the expenditure of sensorial power is for a while lessened, but not its general production in the brain, nor its derivation into the weakly-stimulated part. Hence in strong people, or such whose fibres abound with sensorial power, if the first tribe of an associate train of motions be deprived in part of its accustomed stimulus, its action becomes diminished; and the sensorial power becomes accumulated, and by its superabundance, or overflowing as it were, increases the action of the second tribe of the associate actions by reverse sympathy. As exposing the warm skin for a moderate time to cold air increases the action of the stomach, and thus strengthens the power of digestion.

On the reverse, when additional stimulus within certain limits is partially applied to parts, which

which are deficient in respect to the natural quantity of sensorial power, the expenditure of sensorial power is increased, but in a less degree than the increased production of it in the brain, or its increased derivation into the strongly-stimulated organ. Hence in weak people, or such whose fibres are deficient of sensorial power, if the first tribe of an associate train of motions be subjected for a while to greater stimulus than usual, a greater production of sensorial power, or a greater derivation of it into the stimulated parts occurs; which by its excess, or overflowing as it were, increases the actions of the second tribe of the associate motions by direct sympathy. Thus when vomiting occurs with cold extremities, a blister on the back in a few hours occasions universal warmth of the skin, and stops the vomiting. And when a diarrhoea occurs with pale skin and cold extremities, the pricking of the points of a flannel shirt, worn next the skin, occasions universal warmth of it, and checks or cures the diarrhoea.

In some associate trains of action nevertheless reverse sympathies more frequently occur than direct ones, and in others direct ones more frequently than reverse ones. Thus in continued fever with debility there appears to be a reverse sympathy between the capillary vessels of the stomach and those of the skin; because there exists a total aversion to solid food, and constant heat on

on the surface of the body. Yet these two systems of vessels are at other times actuated by direct sympathy, as when paleness attends sickness, or cold feet induces indigestion. This subject requires to be further investigated, as it probably depends not only on the present or previous plus or minus of the sensorial power of association, but also on the introduction of other kinds of sensorial power, as in Class IV. I. I. D; or the increased production of it in the brain, or the greater mobility of one part of a train of actions than another.

Thus when much food or wine is taken into the stomach, if there be no superfluity of sensorial power in the system, that is, none to be spared from the continual actions of it, a paleness and chillness succeed for a time; because now the expenditure of it by the increased actions of the stomach is greater than the present production of it. In a little time however the stimulus of the food and wine increases the production of sensorial power in the brain, and this produces a superfluity of it in the system; in consequence of which the skin now becomes warm and florid, which was at first cold and pale; and thus the reverse sympathy is shortly converted into a direct one; which is probably owing to the introduction of a second sensorial power, that of pleasurable sensation.

On the contrary, when an emetic drug produces

duces sickness, the skin is at first pale for a time by direct sympathy with the capillaries of the stomach; but in a few minutes, by the accumulation of sensorial power in the stomach during its less active state in sickness, the capillaries of the skin, which are associated with those of the stomach, act with greater energy by reverse sympathy, and a florid colour returns. Where the quantity of action is diminished in the first part of a train of motions, whether by previous diminution of sensorial power, or present diminution of stimulus, the second part of the train becomes torpid by direct sympathy. And when the quantity of action of the first part becomes increased by the accumulation of sensorial power during its previous torpor, or by increase of stimulus, the actions of the second part of it likewise become increased by direct sympathy.

In moderate hunger the skin is pale, as before dinner, and in moderate sickness, as no great accumulation of sensorial power has commenced; but in violent hunger, and in greater torpor of the stomach, as from contagious matter, the accumulation of sensorial power becomes so great as to affect the arterial and capillary system, and fever is produced in both cases.

In contagious fevers with arterial debility commencing with torpor of the stomach, why is the action of the heart weakened, and that of the capillaries increased? Is it because the mobility of the

the heart is less than that of the stomach, and the mobility of the capillaries greater? Or is it because the association between the muscular fibres of the stomach and those of the heart have been uniformly associated by direct sympathy; and the capillaries of the stomach and those of the skin have been more frequently associated by reverse sympathy?

Where the actions of the stomach have been previously exhausted by long stimulus, as on the day after intoxication, little or no accumulation of sensorial power occurs, during the torpor of the organ, beyond what is required to replace the deficiency of it, and hence fever seldom follows intoxication. And a repetition of the stimulus sometimes becomes necessary even to induce its natural action, as in dram-drinkers.

Where there has been no previous exhaustion of sensorial power, and the primary link of associate motions is violently actuated by the sensorial power of sensation, the secondary link is also violently actuated by direct sympathy; as in inflammatory fevers. Where however the sensorial power of the system is less than natural, the secondary link of associated motions becomes torpid by reverse sympathy, as in the inoculated small-pox during the eruption on the face the feet are frequently cold.

G. Associations affected four Ways.

Hence associated trains or circles of motions may be affected four different ways. 1. By the greater or less energy of action of the first link with which they are catenated, and from which they take their names; as irritative, sensitive, or voluntary associations. 2. By being excited by two or more sensorial powers at the same time, as by irritation and association, as in the instance of the application of the stimulus of increased external heat to the cutaneous capillaries. 3. By catenation with other sensorial powers, as with pain or pleasure, which are in this case not the proximate cause of motion, but which, by becoming a link of catenation, excite the sensorial power of association into action; as the pain at the neck of the gall-bladder occasioned by a gall-stone is transferred to the other end of that canal, and becomes a link of catenation between the action of the two extremities of it. 4. The influence of ethereal fluids, as of heat and gravitation. To which last perhaps might be added moisture and oxygen gas as constituting necessary parts of the system, rather than stimuli to excite it into action.

H. The

H. The Origin of Associations.

Some trains or circles of associate motions must have been formed before our nativity, as those of the heart, arteries, and capillaries; others have been associated, as occasion required them, as the muscles of the diaphragm and abdomen in vomiting; and others by perpetual habit, as those of the stomach with the heart and arteries directly, as in weak pulse during sickness; with the capillaries directly, as in the flushed skin after dinner; and lastly, with the cellular absorbents reversely, as in the increased absorption in anasarca during sickness; and with the irritative motions of the organs of sense reversely, as in vertigo, or sea-sickness. Some of these associations shall be here shortly described to facilitate the investigation of others.

First, other congeries of glands occupy but a particular part of the system, or constitute a particular organ, as the liver, or kidneys; but those glands, which secrete the mucus, and perspirable matter, which are called capillaries, are of very great extent; they receive the blood from the arteries, separate from it the mucus, which lines every cell, and covers every cavity of the body; and the perspirable matter, which softens and lubricates the whole surface of the skin, and the more extensive surface of the air-vessels, which compose

the lungs. These are supplied with blood by the perpetual action of the heart and arteries, and have therefore their motions associated with the former, and with each other, by sympathy, which is sometimes direct, and sometimes reverse.

One branch of this association, the capillaries of the skin, is very irritable by the increased quantities of cold and heat; another branch, that of the lungs, has not the perception of cold and heat, but is liable by direct sympathy to act in concert with the former, as in going into the cold bath. And it is probable the capillaries of the internal membranes are likewise directly affected by their sympathy with those of the skin, as appears from the defect of secretion in ulcers during the cold fits of agues.

The motions of this extensive system of capillaries, thus associated by direct sympathy, are also associated with those of the heart and arteries, sometimes by reverse and sometimes by direct sympathy; and thus constitute simple fever. The cold paroxysm of which consists in their torpor, and the hot one in their orgasm, or increased activity.

I. *Of the Action of Vomiting.*

The manner, in which the stomach and the diaphragm and abdominal muscles acquire their associate

associate action in vomiting, requires some attention. It is not probable, that this action of vomiting occurs before nativity; as the uniform application of the nutritive liquor amnii to the mouth of the foetus, and the uniform expenditure of its nourishment, would not seem to give occasion to too great temporary repletion of the stomach; and would preclude the deglutition of any improper material. After nativity the stomach of the child may be occasionally too much distended with milk; as previous hunger may induce it to overgorged itself; and by repeated efforts the act of vomiting is learned, as a means of getting free from a disagreeable sensation. Thus when any disgusting material, as a bitter drug, is taken into the mouth; certain retrograde motions of the tongue and lips are produced, for the purpose of putting the disagreeable material out of the mouth again.

When the stomach is disagreeably stimulated by the distention or acrimony of the aliment, a similar effort to regurgitate it must occur; and by repeated trials the action of the diaphragm and abdominal muscles by squeezing the stomach assists its retrograde exertion to disgorge its contents. In the same manner when a piece of gravel is pushed into the urethra, or a piece of indurated, bile into the neck of the gall-bladder, after they have been in vain pressed forward by the usual motions of those ducts, they return into the blad-

ders of gall and urine by the retrograde motions of them.

That this is one mode, in which vomiting is induced, appears from the instantaneous rejection from the stomach occasioned by some nauseous drug, or from some nauseous idea; and lastly, from the voluntary power, which some people have been said to have acquired, of emptying their stomachs, much in the same manner as ruminating animals bring up the grass from their first stomach.

There are nevertheless many modes by which these inverted motions of the stomach and œsophagus are induced, and which it is of consequence to distinguish from each other. The first is the mode above described, where an effort is made to dislodge something, which stimulates the stomach into disagreeable sensation; and which is returned by repeated exertions; as when a nauseous drug is taken into the mouth, or a bit of sand falls into the eye, or a drop of water into the wind-pipe. In this the peristaltic motions of the stomach are first stopped, and then reverted by painful sensation; and the abdominal muscles and diaphragm by repeated efforts become associated with them. Now as less sensorial power is expended on the retrograde actions of the stomach, and of the lymphatics, which open their mouths on its surface, than by their natural motions, an accumulation of sensorial power in the fibres of

the stomach follows the exhibition of an emetic, and on that account an emetic will sometimes stop a spontaneous vomiting which was owing to sensorial deficiency. See Sect. XXXV. 1. 3. and Art. V. 2. 1.

As bitters and metallic salts, exhibited in small doses, stimulate the stomach into greater action, as appears by their increasing the power of digestion, and yet become emetic, when given in larger doses; one might suspect, that they became emetic by inducing debility, and consequent retrograde actions of the stomach, by their previously exhausting the sensorial power by their great stimulus; which might be effected in a moment without producing pain, and in consequence without our perceiving it. But on the contrary, there does not in general appear on the exhibition of emetics to be any previous exhaustion of sensorial power; because there is evidently an accumulation of it during the sickness, as appears from the digestion being stronger afterwards; and from the increased action of the cellular and cutaneous absorbents during its operation. See Art. V. 2. 1.

Another mode by which vomiting is induced, is owing to debility or deficiency of sensorial power, from the previous exhaustion of it; as on the day after intoxication, or which occurs in people enfeebled with the gout, and in dropsy, and in some fevers with debility. In these, when the vomiting ceases, there is no appearance of ac-

cumulation of sensorial power, as the digestion still remains weak and imperfect.

Another mode by which sickness or vomiting is induced, is by defect of stimulus, as in great hunger; and in those, who have been habituated to spice and spirit with their meals, who are liable to be sick after taking food without these additional stimuli. Other means of inducing sickness by vertigo, or by nauseous ideas, will be mentioned below.

We shall only add, that the motions of the muscular fibres of the stomach are associated with those of the heart and arteries by direct sympathy, as appears by the weakness of the pulse during the exhibition of an emetic; and that the absorbents of the stomach are associated with the cellular and cutaneous absorbents by reverse sympathy, as is shewn by the great absorption of the mucus of the cells in anasarca during sickness; at the same time that the absorbents of the stomach invert their actions, and pour the mucus and water thus absorbed into that viscus.

In cold paroxysms of fever the stomach partakes of the general torpor, and vomiting is induced by its debility, either by its association with the torpid capillaries, or other torpid parts, or by its own torpor commencing first, and causing the cold fit. The disordered motions of the stomach frequently seem to be the cause or primary seat of fever, as where contagious miasma are swallowed with the

saliva,

saliva, and where fever is produced by sea-sickness, which I once saw. Nevertheless a disorder of the stomach does not always induce fever, as in that case it should constantly attend indigestion, and vertigo, and sea-sickness; but is itself frequently induced by association with the disordered movements of other parts of the system, as when it arises from gravel in the ureter, or from a percussion on the head.

The connexion of the motions of the stomach with irritative ideas, or motions of the organs of sense, in vertigo, is shewn in Sect. XX. and thus it appears, that many circles of association are either directly or reversely associated, or catenated, with this viscus; which will much contribute to unfold some of the symptoms of fever.

K. *Tertian Associations.*

The third link of associate trains of motion is sometimes actuated by reverse sympathy, with the second link, and that by reverse sympathy with the first link; so that the first and third link may act by direct sympathy, and the intermediate one by reverse sympathy. Of this, instances are given in the *singultus nephriticus*, Class IV. 1. 1. 7. and IV. 2. 1. At other times the tertian or quartan links of associate motions are actuated by direct sympathy; and that sometimes forwards and sometimes backwards in respect to the usual order of

of those trains of associate motions, as in Class IV.
1 2. 1.

SPECIES.

1. *Rubor vultus pranorum.* Flushing of the face after dinner is explained in Sect. XXXV. 1. In the beginning of intoxication the whole skin becomes florid from the association of the actions of the cutaneous arteries with those of the stomach, because vinous spirit excites the fibres of the stomach into more violent action than the stimulus of common food; and the cutaneous capillaries of the face, from their more frequent exposure to the vicissitudes of cold and heat, possess more mobility or irritability than those of other parts of the skin, as further explained in Sect. XXXIII. 2. 10. Vinegar is liable to produce this flushing of the face, which probably is owing to the quantity of vinous spirit it contains, as I believe the unfermented vegetable acids do not produce this effect. In every kind of blush the arterial blood is propelled into the capillaries faster than the venous absorption can carry it forwards into the veins, in this respect resembling the *tenus phalli*.

Can the beginning vinous or acetous fermentation of the aliment in weak stomachs contribute to this effect? or is it to be ascribed to the greater power of association between the arteries
of

of the face and the fibres of the stomach in some people than in others?

M. M. Eat and drink less at a time, and more frequently. Put 20 drops of weak acid of vitriol into water to be drunk at meals. Let the dress over the stomach and bowels be loose. Use no fermented liquors, or vinegar, or spice.

2. *Sudor strigulis immersorum*. Sweat from being covered in bed. In the commencement of an epidemic fever, in which the perpetual efforts to vomit was a distressing symptom, Dr. Sydenham discovered, that if the patient's head was for a short time covered over with the bed-clothes, warmth was produced, and a sweat broke out upon the skin, and the tendency to vomit ceased. In this curious fact two trains of associated motions are excited into increased action. First, the vessels of the lungs are known to have their motion associated with those of the skin by the difficulty of breathing on going into the cold bath, as described in Sect. XXXII. 3. 2. Hence, when the vessels of the lungs become excited into stronger action, by the bad air under the bed-clothes, warmed and adulterated by frequent breathing, those of the external skin soon become excited by their association into more energetic action, and generate more heat along with a greater secretion of perspirable matter. Secondly, the sympathy between the stomach and skin is evident in variety

riety of circumstances; thus the cold air of frosty days applied to the skin for a short time increases the action of the stomach by reverse sympathy, but decreases it if continued too long by direct sympathy; so in the circumstance above mentioned, the action of the stomach is increased by direct sympathy with that of the skin; and the tendency to vomit, which was owing to its diminished action, ceases.

3. *Cessatio ægritudinis cœte excitata.* The cure of sickness by stimulating the skin. This is explained in the preceding article; and further noticed in IV. 2. 2. 4. and in IV. 1. 1. F.

Similar to these is the effect of a blister on the back in relieving sickness, indigestion, and heart-burn; and, on the contrary, by these symptoms being frequently induced by coldness of the extremities. The blister stimulates the cutaneous vessels into greater action; whence warmth and pain are produced at the same time, and the fibres of the stomach are excited into greater action by their association with those of the skin. It does not appear, that the concomitant pain of the blister causes the increased energy of the stomach, because the motions of it are not greater than natural; though it is sometimes difficult to determine, whether the primary part of some associated trains be connected with irritative or sensitive motions.

In the same manner a flannel shirt, to one who has

has not been in the habit of wearing one, stimulates the skin by its points, and thus stops vomiting in some cases; and is particularly efficacious in checking some chronical diarrhoeas, which are not attended with fever; for the absorbents of the skin are thus stimulated into greater action, with which those of the intestines consent by direct sympathy.

This effect cannot be ascribed to the warmth alone of the flannel shirt, as being a covering of loose texture, and confining air in its pores, like a sponge, which air is known to be a bad conductor of heat, since in that case its use should be equally efficacious, if it were worn over a linen shirt; and an increased warmth of the room of the patient would be equally serviceable.

4. *Digestio aucta frigore cutaneo.* Digestion increased by coldness of the skin. Every one has experienced the increase of his appetite after walking in the cool air in frosty days; for there is at this time not only a saving of sensorial power by the less exertion of the cutaneous vessels; but, as these consent with those of the stomach and bowels, this saving of sensorial power is transferred by reverse sympathy from the cutaneous capillaries and absorbents to those of the stomach and intestines.

Hence weak people should use the cold air of winter as a cold bath; that is, they should stay in

it but a short time at once, but should immerse themselves in it many times a day.

5. *Catarrhus a frigore cutaneo.* Catarrh from cold skin. This has been already explained in Class I. 1. 2. 7. and is further described in Sect. XXXV, 1. 3. In this disease the vessels of the membrane, which lines the nostrils, are excited into greater action; when those of the skin, with which they are associated, are excited into less action by the deficiency of external heat, by reverse sympathy; and though the pain of cold attends the torpor of the primary link of this association, yet the increased motions of the membrane of the nostrils are associated with those of the cutaneous vessels, and not with the pain of them, because no inflammation follows.

6. *Absorptio cellularis aucta vomitu.* In the act of vomiting the irritative motions of the stomach are inverted, and of the absorbents, which open their mouths into it; while the cutaneous, cellular, and pulmonary absorbents are induced, by reverse sympathy with them, to act with greater energy. This is seen in cases of anasarca, when long sickness and vomiting are caused by squills, or antimonial salts, or most of all by the decoction of digitalis purpurea, foxglove; and Mr. J. Hunter mentions a case, in which a large bubo, which was just ready to break, was absorbed in a few

few days by sickness at sea. Treatise on the Blood, p. 501, which is thus accounted for; less sensorial power is expended during sickness by the decreased action of the fibres of the stomach, and of its absorbents; as shewn in Sect. XXXV. 1. 3. whence an accumulation of it is produced, and there is in consequence a greater quantity of sensorial power for the exertion of those motions, which are associated with the absorbents of the stomach by reverse sympathy.

The reverse sympathy between the lacteal and lymphatic branches of the absorbent system have been produced by the one branch being less excited to act, when the other supplies sufficient fluid or nutriment to the sanguiferous vessels. Thus when the stomach is full, and the supply of chyle, and mucus, and water is in sufficient quantity; the pulmonary, cellular, and cutaneous lymphatics are not excited into action; whence the urine is pale, and the skin moist, from the defect of absorption on those surfaces.

7. *Singultus nephriticus.* When a stone irritates the ureter, and that even without its being attended with pain or fever, sometimes a chronic hiccup occurs, and continues for days and weeks, instead of sickness or vomiting; which are the common symptoms. In this case the motions of the stomach are decreased by their sympathy with those of the ureter, which are increased

creased by the stimulus of the stone in it; and the increased motions of the diaphragm seem to exist in consequence of their association with the stomach by a second reverse sympathy. This hiccough may nevertheless admit of another explanation, and be supposed to be a convulsive exertion of the diaphragm to relieve the disagreeable sensation of the stomach in consequence of its disordered irritative associations; and in that case it would belong to Class III. I. 1. See Class IV. 2. 1. for another example of tertiary association.

M.M. Venefection. Emetic. Calomel. Cathartic, opium, oil of cinnamon from two to ten drops. Aerated alcaline water. Peruvian bark.

8. *Febris irritativa.* Irritative fever, described in Class I. I. I. 1. The diseases above explained in this genus are chiefly concerning the sympathies of the absorbent system, or the alimentary canal, which are not so much associated with the arterial system as to throw it into disorder, when they are slightly deranged; but when any great congeries of conglomerate glands, which may be considered as the extremities of the arterial system, are affected with torpor, the whole arterial system and the heart sympathize with the torpid glands, and act with less energy; which constitutes the cold fit of fever; which is therefore at first a decreased

creased action of the associate organ; but as this decrease of action is only a temporary effect, and an increase of exertion both of the torpid glands, and of the whole arterial system, soon follows; the hot fit of irritative fever, or fever with strong pulse, properly belongs to this class and genus of diseases.

ORDO I.

Increased Associate Motions.

GENUS II.

Catenated with Sensitive Motions.

THE primary links of the associated actions of this genus are either produced or attended by painful or pleasurable sensation. The secondary links of the first ten species are attended with increased motions without inflammation, those of the remainder are attended with inflammation. All inflammations, which do not arise in the part which was previously torpid, belong to this genus; as the gout, rheumatism, erysipelas. It is probable many other inflammations may, by future observation, require to be transplanted into this class.

The circles of sensitive associate motions consist chiefly of the excretory ducts of the capillaries and of the mouths of the absorbent vessels, which constitute the membranes; and which have been induced into action at the same time; or they consist of the terminations of canals; or of parts which are endued with greater sensibility than those which form the first link of the association. An instance of the first of those is the sympathy between the membranes of the alveolar processes

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of the jaws, and the membranes above or beneath the muscles about the temples in hemicrania. An instance of the second is in the sympathy between the excretory duct of the lacrymal gland, and the nasal duct of the lacrymal sac. And an instance of the third is the sympathy between the membranes of the liver, and the skin of the face in the gutta rosea of inebriates.

SPECIES.

1. *Lacrymarum fluxus sympatheticus.* A flow of tears from grief or joy. When the termination of the duct of the lacrymal sac in the nostrils becomes affected either by painful or pleasurable sensations, in consequence of external stimulus, or by its association with agreeable or disagreeable ideas, the motions of the lacrymal gland are at the same time exerted with greater energy, and a profusion of tears succeeds by sensitive association, as explained in Sect. XVI. 8. 2.

In this case there exists a chain of associated actions, the secretion of the lacrymal gland is increased by whatever stimulates the surface of the eye, at the same time the increased abundance of tears stimulates the puncta lacrymalia into greater action; and the fluid thus absorbed stimulates the lacrymal sac, and its nasal duct in the nose into greater action. In a contrary direction of

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in this chain of association the present increase of action is induced. First, the nasal duct of the lacrymal sac is excited into increased action by some pleasurable or painful idea, as described in Sect. XVI. 8. 2. 2d. The puncta lacrymalia or other extremity of the lacrymal sac sympathizes with it (as the two ends of all other canals sympathize with each other): 3d. With these increased motions of the puncta lacrymalia those of the excretory duct of the lacrymal gland are associated from their having so perpetually acted together. And, lastly, with the increased actions of the excretory duct of this gland are associated those of the other end of it by their frequently acting together; in the same manner as the extremities of other canals are associated, and thus a greater flow of tears is poured into the eye.

When a flow of tears is produced in grief, it is believed to relieve the violence of it, which is worthy a further inquiry. Painful sensations, when great, excite the faculty of volition; and the person continues voluntarily to call up or perform those ideas, which occasion the painful sensation; that is, the afflicted person becomes so far insane or melancholy; but tears are produced by the sensorial faculty of association, and shew that the pain is so far relieved as not to exalt the excessive power of volition, or insanity; and are therefore a sign of the abatement of the painful

painful state of grief, rather than a cause of that abatement. See Class III. I. 2. 10.

2. *Sternutatio a lumine.* Some persons sneeze from looking up at the light sky in a morning after coming out of a dark bed room. The olfactory nerves are brought into too great action by their sympathy with the optic nerves, or by their respective sympathies with some intervening parts, as probably with the two extremities of the lacrymal sac; that is, with the puncta lacrymalia and the nasal duct. See Class II. I. 1. 3.

3. *Dolor dentium a stridore.* Tooth-edge from grating sounds, and from the touch of certain substances, and even from imagination alone, is described and explained in Sect. XVI. 10. The increased actions of the alveolar vessels or membranes are associated with the ideas, or sensual motions of the auditory nerves in the first case; and of those of the sense of touch, in the second case; and by imagination, or ideas exerted of painful sensation alone, in the last.

4. *Risus sardonicus.* A disagreeable smile attends inflammations of the diaphragm arising from the associations of the reiterated exertions of that muscle with those of the lips and cheeks in laughing. See Diaphragmitis, Class II. I. 2. 6.

5. *Salivæ fluxus cibo viso.* The flow of saliva into the mouths of hungry animals at the sight or smell of food is seen in dogs standing round a dinner-table. The increased actions of the salivary glands have been usually produced by the stimulus of agreeable food on their excretory ducts during the mastication of it; and with this increased action of their excretory ducts the other terminations of those glands in the capillary arteries have been excited into increased action by the mutual association of the ends of canals; and at the same time the pleasurable ideas, or sensual motions, of the sense of smell and of sight have accompanied this increased secretion of saliva. Hence this chain of motions becomes associated with those visual or olfactory ideas, or with the pleasure, which produces or attends them.

6. *Tenso mammularum viso puerulo.* The nipples of lacteiferous women are liable to become turgid at the sight of their young offspring. The nipple has generally been rendered turgid by the titillation of the lips or gums of the child in giving suck; the visible idea of the child has thus frequently accompanied this pleasurable sensation of parting with the milk, and turgescence of the tubes, which constitute the nipple. Hence the visual idea of the child, and the pleasure which attends it, become associated with those increased arterial actions, which swell the cells of the mamma,

mula, and extend its tubes ; which is very similar to the tensio phalli visâ muliere nuda etiam in insomnio.

7. *Tensio penis in hydrophobia.* An erection of the penis occurs in the hydrophobia, and is a troublesome symptom, as observed by Coelius Aurelianus, Fothergill, and Vaughan, and would seem to be produced by an unexplained sympathy between the sensations about the fauces and the penis. In men the hair grows about both these parts, the voice changes, and the neck thickens at puberty. In the mumps, when the swellings about the throat subside, the testicles are liable to swell. Venereal infection received by the penis is very liable to affect the throat with ulcers. Violent coughs, with soreness or rawness about the fauces are often attended with erection of the penis ; which is also said to happen to male animals, that are hanged ; which last circumstance has generally been ascribed to the obstruction of the circulation of the blood, but is more probably occasioned by the stimulus of the cord in compressing the throat ; since if it was owing to impeded circulation it ought equally to occur in drowning animals.

In men the throat becomes so thickened at the time of puberty, that a measure of this is used to ascertain the payment of a poll-tax on males in some of the islands of the Mediterranean, which

commences at puberty; a string is wrapped twice round the thinnest part of the neck, the ends of it are then put into each corner of the mouth; and if, when thus held in the teeth, it passes readily over the head, the subject is taxable.

It is difficult to point out by what circumstance the sensitive motions of the penis and of the throat and nose become associated; I can only observe, that these parts are subjected to greater pleasurable sensations than any other parts of the body; one being designed to preserve ourselves by the pleasure attending the smell and deglutition of food; and the other to ensure the propagation of our species: and may thus gain an association of their sensitive motions by their being eminently sensible to pleasure. See Class I. 3. 1. 11. and III. 1. 1. 15. and Sect. XVI. 5. See *Gonorrhœa venerea*, II. 1. 5. 1.

In the female sex this association between the face, throat, nose, and pubis, does not exist; whence no hair grows on their chins at the time of puberty, nor do their voices change, or their necks thicken. This happens probably from there being in them a more exquisite sensitive sympathy between the pubis and the breasts. Hence their breasts swell at the time of puberty, and secrete milk at the time of parturition. And in the parotitis, or mumps, the breasts of women swell, when the tumor of the parotitis subsides. See Class I. 1. 2. 15. Whence it would appear, that

that their breasts possess an intermediate sympathy between the pubis and the throat; as they are the seat of a passion, which men do not possess, that of suckling children.

8. *Tenesmus calculosus.* The sphincter of the rectum becomes painful or inflamed from the association of its sensitive motions with those of the sphincter of the bladder, when the latter is stimulated into violent pain or inflammation by a stone.

9. *Polypus narium ex ascaridibus?* The stimulation of ascarides in the rectum produces, by sensitive sympathy, an itching of the nose, as explained in IV. 2. 2. 6; and in three children I have seen a polypus in the nose, who were all affected with ascarides; to the perpetual stimulation of which, and the consequent sensitive association, I was led to ascribe the inflammation and thickening of the membrane of the nostrils.

10. *Crampus furarum in cholera.* A cramp of the muscles of the legs occurs in violent diarrhoea, or cholera, and from the use of too much acid diet in gouty habits. This seems to sympathize with uneasy sensation in the bowels. See Class III. 1. 1. 14. This association is not easily accounted for, but is analogous in some degree to the paralysis of the muscles of the arms in *colica saturnina*.

nina. It would seem, that the muscles of the legs in walking get a sympathy with the lower parts of the intestines, and those of the arms in variety of employment obtain a sympathy with the higher parts of them. See Cholera and Ileus.

11. *Zona ignea nephritica.* Nephritic shingles. The external skin about the loins and sides of the belly I suppose to have greater mobility in respect to sensitive association, than the external membrane of the kidney; and that their motions are by some unknown means thus associated. When the torpor or beginning inflammation of this membrane ceases, the external skin becomes inflamed in its stead, and a kind of herpes, called the shingles, covers the loins and sides of the belly. See Class II. 1. 5. 9.

12. *Eruptio variolarum.* After the inflammation of the inoculated arm has spread for a quarter of a lunation, it affects the stomach by reverse sympathy; that is, the actions of the stomach are associated with those of the skin; and as much sensorial power is now exerted on the inflamed skin, the other part of this sensitive association is deprived of its natural share, and becomes torpid, or inverts its motions. After this torpor of the stomach has continued a time, and much sensorial power is thus accumulated; other parts of the skin, which are also associated with

it, as that of the face first, are thrown into partial inflammation; that is the eruptions of the small-pox appear on the face.

For that the variolous matter affects the stomach previous to its eruption on the skin, appears from the sickness at the commencement of the fever; and because, when the morbid motions affect the skin, those of the stomach cease; as in the gout and erysipelas, mentioned below. The consent between the stomach and the skin appears in variety of other diseases; and as they both consist of surfaces, which absorb and secrete a quantity of moisture, their motions must frequently be produced together, or in succession; which is the foundation of all the sympathies of animal motions, whether of the irritative, sensitive, or voluntary kinds.

Now as the skin, which covers the face, is exposed to greater variations of heat and cold than any other part of the body; it probably possesses more mobility to sensitive associations, not only than the stomach, but than any other part of the skin; and is thence affected at the eruption of the small pox with violent action and consequent inflammation, by the association of its motions with those of the stomach, a day before the other parts of the skin; and becomes fuller of pustules, than any other part of the body. See Class II. I. 3. 9.

It might be supposed, that the successive swelling

ing of the hands, when the face subsides, at the height of the small-pox, and of the feet, when the hands subside, were governed by some unknown associations of those parts of the system; but these successions of tumor and subsidence more evidently depend on the times of the eruption of the pustules on those parts, as they appear a day sooner on the face than on the hands, and a day sooner on the hands than on the feet, owing to the greater comparative mobility of those parts of the skin.

13. *Gutta rosea stomatica.* Stomachic red face. On drinking cold water, or cold milk, when heated with exercise, or on eating cold vegetables, as raw turnips, many people in harvest-time have been afflicted with what has been called a surfeit. The stomach becomes painful, with indigestion and flatulency, and after a few days an eruption of the face appears, and continues with some relief, but not with entire relief; as both the pimpled face and indigestion are liable to continue even to old age.

M. M. Venefection. A cathartic with calomel. Then half a grain of opium twice a day for many weeks. If saturated solution of arsenic three or five drops twice or thrice a day for a week?

14. *Gutta rosea hepatica.* The rosy drop of the face of some drinking people is produced like the gout

gout described below; in consequence of an inflamed liver. In these constitutions the skin of the face being exposed to greater variation of heat and cold than the membranes of the liver, possesses more mobility than those hepatic membranes; and hence by whatever means these membranes are induced to sympathize, when this sensitive association occurs, the cutaneous vessels of the face run into greater degrees of those motions, which constitute inflammation, than previously existed in the membranes of the liver; and then those motions of the liver cease. See Class II. I. 4. 6.

As inflammation of the liver so frequently attends the great potation of vinous spirit, there is reason to suspect, that this viscus itself becomes inflamed by sensitive association with the stomach; or that, when one termination of the bile-duct, which enters the duodenum, is stimulated violently, the other end may become inflamed by sensitive association.

15. *Podagra.* The gout, except when it affects the liver or stomach, seems always to be a secondary disease, and, like the rheumatism and erysipelas mentioned below, begins with the torpor of some distant part of the system.

The most frequent primary seat of the gout I suppose to be the liver, which is probably affected with torpor not only previous to the annual paroxysms

oxysins of the gout, but to every change of its situation from one limb to another. The reasons, which induce me to suspect the liver to be first affected, are not only because the jaundice sometimes attends the commencement of gout, as described in Sect. XXIV. 2. 8. but a pain also over the pit of the stomach, which I suppose to be of the termination of the bile-duct in the duodenum, and which is erroneously supposed to be the gout of the stomach, with indigestion and flatulency, generally attends the commencement of the inflammation of each limb. See Arthritis ventriculi, Class I. 2. 4. 6. In the two cases, which I saw, of the gout in the limbs being preceded by jaundice, there was a cold shivering fit attended the inflammation of the foot, and a pain at the pit of the stomach ; which ceased along with the jaundice, as soon as the foot became inflamed. This led me to suspect, that there was a torpor of the liver, and perhaps of the foot also, but nevertheless the liver might also in this case be previously inflamed, as observed in Sect. XXIV. 2. 8.

Now as the membranes of the joints of the feet suffer greater variations of heat and cold than the membranes of the liver, and are more habituated to extension and contraction than other parts of the skin in their vicinity ; I suppose them to be more mobile, that is, more liable to run into extremes of exertion or quiescence ; and are thence more susceptible of inflammation, than such parts

as are less exposed to great variations of heat and cold, or of extension and contraction.

When a stone presses into the sphincter of the bladder, the glans penis is affected with greater pain by sympathy, owing to its greater sensibility, than the sphincter of the bladder ; and when this pain commences, that of the sphincter ceases, when the stone is not too large, or pushed too far into the urethra. Thus when the membrane, which covers the ball of the great toe, sympathizes with some membranous part of a torpid or inflamed liver ; this membrane of the toe falls into that kind of action, whether of torpor or inflammation, with greater energy, than those actions excited in the diseased liver ; and when this new torpor or inflammation commences, that with which it sympathizes ceases ; which I believe to be a general law of associated inflammations.

The paroxysms of the gout would seem to be catenated with solar influence, both in respect to their larger annual periods, and to their diurnal periods—See Sect. XXXVI. 3. 6—as the former occur about the same season of the year, and the latter commence about an hour before sun-rise ; nevertheless the annual periods may depend on the succession of great vicissitudes of cold and heat, and the diurnal ones on our increased sensibility to internal sensations during sleep, as in the fits of asthma, and of some epilepsies. See Sect. XVIII. 15.

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In respect to the pre-remote cause or disposition to the gout, there can be no doubt of its individually arising from the potation of fermented or spirituous liquors in this country; whether opium produces the same effect in the countries, where it is in daily use, I have never been well informed. See Sect. XXI. 10: where this subject is treated of; to which I have to add, that I have seen some, and heard of others, who have moderated their paroxysms of gout, by diminishing the quantity of fermented liquors, which they had been accustomed to; and others who, by a total abstinence from fermented liquors, have entirely freed themselves from this excruciating malady; which otherwise grows with our years, and curtails or renders miserable the latter half, or third, of the lives of those, who are subject to it. The remote cause is whatever induces temporary torpor or weakness of the system; and the proximate cause is the irritability, or defective irritation, of some part of the system; whence torpor and consequent inflammation. The great Sydenham saw the beneficial effects of the abstinence from fermented liquors in preventing the gout, and adds, "if an empiric could give small-beer only to gouty patients as a nostrum, and persuade them not to drink any other spirituous fluids, he might rescue thousands from this disease, and acquire a fortune for his ingenuity." Yet it is to be lamented, that this accurate observer of diseases had not resolution to practise his own prescription,

scription, and thus to have set an example to the world of the truth of his doctrine ; but, on the contrary, recommended Madeira, the strongest wine in common use, to be taken in the fits of the gout, to the detriment of thousands ; and is said himself to have perished a martyr to the disease, which he knew how to subdue !

As example has more forcible effect than simple assertion, I shall now concisely relate my own case, and that of one of my most respected friends. E. D. was about forty years of age, when he was first seized with a fit of the gout. The ball of his right great toe was very painful, and much swelled and inflamed, which continued five or six days in spite of venefection, a brisk cathartic with ten grains of calomel, and the application of cold air and cold water to his foot. He then ceased to drink ale or wine alone ; confining himself to small-beer, or wine diluted with about thrice its quantity of water. In about a year he suffered two other fits of the gout, in less violent degree. He then totally abstained from all fermented liquors, not even tasting small-beer, or a drop of any kind of wine ; but ate plentifully of flesh-meat, and all kinds of vegetables, and fruit, using for his drink at meals chiefly water alone, or lemonade, or cream water ; with tea and coffee between them as usual.

By this abstinence from fermented liquors he kept quite free from the gout for fifteen or six-

teen years; and then began to take small-beer mixed with water occasionally, or wine and water, or perry and water, or cyder and water; by which indulgence after a few months he had again a paroxysm of gout, which continued about three days in the ball of his toe; which occasioned him to return to his habit of drinking water, and he has now for above twenty years kept in perpetual health, except accidental colds from the changes of the seasons. Before he abstained from fermented or spirituous liquors, he was frequently subject to the piles, and to the gravel, neither of which he has since experienced.

In the following case the gout was established by longer habit and greater violence, and therefore required more cautious treatment. The Rev. R. W. was seized with the gout about the age of thirty-two, which increased so rapidly that at the age of forty-one he was confined to his room seven months in that year; he had some degree of lameness during the intervals, with chalky swellings of his heels and elbows. As the disease had continued so long and so violently, and the powers of his digestion were somewhat weakened, he was advised not entirely to leave off all fermented liquors; and as small-beer is of such various strength, he was advised to drink exactly two wine glasses, about four ounces, of wine mixed with three or four times its quantity of water, with or without lemon and sugar, for his daily potion at

dinner, and no other fermented liquor of any kind; and was advised to eat flesh-meat with any kind of boiled vegetables, and fruit, with or without spice. He has now scrupulously continued this regimen for above five years, and has had an annual moderate gouty paroxysm of a few weeks, instead of the confinement of so many months, with great health and good spirits during the intervals.

The following is a more particular account of the history of this case; being part of a letter which Mr. Wilmot wrote on that subject at my entreaty.

" I entered into the army with an excellent constitution at the age of fifteen. The corps I served in was distinguished by its regularity, that is, the regular allowance of the mess was only one pint of wine per man each day; unless we had company to dine with us; then, as was the general custom of the time, the bottle circulated without limit. This mode of living, though by no means considered as excess for men, was certainly too great for a youth of my age. This style of living I continued, when with the regiment, till the latter end of the year 1769, when I had the misfortune to sleep in a damp bed at Sheffield on a journey to York, but arrived there before I felt the ill effects of it. I was then seized with a violent inflammatory rheumatism with great inflammation of my eyes, and was attended by Dr. Dealtry; so violent was the disorder, that I was

bled for it eight times in less than a fortnight ; and was three months, before I could consider my health perfectly reestablished. Dr. Dealy told me, that I should be subject to similar attacks for many years ; and that he had no doubt, from the tendency he found in my habit to inflammation, that, when I was farther advanced in life, I should change that complaint for the gout. He predicted truly ; for the three succeeding winters I had the same complaint, but not so violently ; the fourth winter I escaped, and imputed my escape to the continuance of cold bathing during the whole of that winter ; after that I never escaped it, till I had a regular and severe fit of the gout : after the first attack of rheumatic fever I was more abstemious in my manner of living, though when in company I never subjected myself to any great restraint. In the year 1774 I had quitted the army, and being in a more retired situation, was seldom led into any excess ; in 1776 and 1777 I was in the habit of drinking a good deal of wine very frequently, though not constantly. After that period till the year 1781, I drank a larger quantity of wine regularly, but very seldom to any degree of intoxication. I lived much at that time in the society of some gentlemen, who usually drank nearly a bottle of wine daily after dinner. I must here however observe, that at no part of my life was I accustomed to drink wine in an evening, and very seldom drank any thing more than a single

single half-pint glass of some sort of spirits diluted with much water. Till the year 1781 I had always been accustomed to use very violent and continued exercise on horse-back; in the winter months I pursued all field diversions, and in the summer months I rode frequent and long journeys; and with this exercise was liable to perspire to great excess; besides which I was subject to very profuse night-sweats, and had frequently boils break out all over me, especially in the spring and autumn; for which I took no medicine, except a little of the flowers of sulphur with cream of tartar in honey.

“ You will observe I bring every thing down to the date of 1781. In the month of October in that year, when I was just entered into the thirty-second year of my age, I had the first attack of gout; that fit was very severe, and of many weeks continuance. I now determined upon a more abstemious method of living, in respect to wine; and indeed the society, in which I had before been accustomed to live, being considerably changed, I had less frequent temptations to excess. From this time I enjoyed the most perfect good state of health till August 1784, when I had my second attack of gout. I never perfectly recovered from this attack through the succeeding winter, and in March 1785 was advised to try the Bath waters, and drank them under the direction of one of the faculty of that place. I was there

soon seized with a fever, and a slight attack of gout in one knee. I should observe, that when I set out from home, I was in a weak and low state, and unequal to much fatigue ; as appeared by my having a fainting fit one day on the road, after having travelled only about fifty miles ; in the course of the summer I had two or three more slight attacks of gout of less consequence, till the month of October ; when I was afflicted with it all over me in such a manner, as to be without the possibility of the least degree of removal for some days ; and was about two months without being able to get into the air. This was the severest attack I had then experienced ; though I have since had several equally severe. In the course of this summer I had a fall with my horse ; and soon after it, having discovered an enlargement on one elbow, I concluded I had hurt it at that time ; but in the course of this last attack having a similar enlargement on the other elbow, I found my mistake, and that they were collections of gouty matter ; these increased to the size of pullet's eggs, and continue in that state. I had soon after similar enlargements on my heels ; the right heel being severely bruised, I was under the necessity of having it lanced, and a large quantity of chalky matter was discharged from it ; and have since that time frequently had chalky matter taken from it, and sometimes small bits of apparently perfect chalk. My right hand was soon afflicted

in

in the same way, and I have scarcely a joint on those fingers now in a natural state. My left hand has escaped tolerably well. After this last attack (viz. October 1785), I had two or three slight attacks before the month of June 1787, when I had a very severe intermittent fever; from that time I continued very well till the latter end of the year, when I began to feel the gout about me very much, but was not confined by it. I was in this state advised to try what is called the American Recipe (gum guaiacum and nitre dissolved in spirits); it had apparently been of essential service to a friend of mine, who from the inability to walk a mile for some years, was believed to be restored by the use of this medicine to a good state of health, so as to walk ten miles a day. In addition to this medicine I drank, as my common beverage with my meals, spruce beer. I had so high an opinion of this medicine in the gout, and of spruce beer as an antiscorbutic, that I contemplated with much satisfaction, and with very little doubt, the perfect restoration of my health and strength; but I was miserably deceived; for in September 1788 I was seized with the gout in a degree that none but arthritics, and indeed but few of these, can easily conceive. From this time till August 1789 I scarcely ever passed a comfortable day; seven months of this time I had been confined, my health seemed much impaired, my strength was diminished, and my appetite almost

gone. In this state my friends pressed me to consult you. I was unwilling for some time to do it, as I had lost all hope of relief; however, when I had determined to apply to you, I likewise determined to give up every prejudice of my own respecting my case, and to adhere most strictly to your advice. On the 20th of August 1789 I consulted you, on the 25th I entered upon the regimen, which you prescribed, and which was as follows.

“ Drink no malt liquor on any account. Let your beverage at dinner consist of two glasses of wine diluted with three half-pints of water. “ On no account drink any more wine or spirituous liquors in the course of the day; but, if you want more liquid, take cream and water, or milk and water, or lemonade, with tea, coffee, chocolate. Use the warm bath twice a week for half an hour before going to bed, at the degree of heat which is most grateful to your sensations. Eat meat constantly at dinner, and with any kind of tender vegetables you please. “ Keep the body open by two evacuations daily, if possible without medicine, if not take the size of a nutmeg of lenitive electuary occasionally, or five grains of rhubarb every night. Use no violent exercise, which may subject yourself to sudden changes from heat to cold; but as much moderate exercise as may be, without being much fatigued or starved with cold.

“ Take

“ Take some supper every night; a small quantity of animal food is preferred; but if your palate refuses this, take vegetable food, as fruit-pie, or milk; something should be eaten, as it might be injurious to you to fast too long.” To the whole of this I adhered most scrupulously, and soon found my appetite improve, and with it my strength and spirits. I had in December a severe attack, and two or three slight ones in the course of twelve months; but the improvement in the general state of my health induced me to persevere. On the 18th of August 1790 I had another severe attack, but it went off easier than before, and I soon recovered sufficiently to go to Buxton, which you advised me to, and from which I reaped great benefit; nevertheless on the 29th of December I had a slight attack in comparison of some that I had before experienced, and from that time I was free from gout, and enjoyed my health perfectly well till the fourth week in October 1791; from that till the third week in October 1792; from that till the third week in October 1793; and from that till June 1794. From what happened for the last three years I dreaded the month of October; but I escaped then, and have enjoyed my health most perfectly ever since till within the last week, that I have had a slight attack in one knee, which is nearly gone, without any symptom to lead me to suppose that it will go further.

“ I adhered

“ I adhered to your advice most scrupulously for the first year ; and in regard to the not drinking malt liquor, and taking only the two glasses of wine with water, I have never deviated but two days ; and then the first day I only drank one glass of ale and one glass of champaigue ; on the second only one glass of champaigne. With regard to the warm bath, I only use it now when I have gouty symptoms upon me, and in such situations I find it of infinite service ; and in other respects I continue to live according to your direction.

“ Many persons have laughed at the idea of my perseverance in a system, which has not been able to *cure* the gout after five years trial ; but such persons are either ignorant of what I before suffered, or totally unacquainted with the nature of the disorder. Under the blessing of Providence, by an adherence to your advice, I am reaping all the benefit you flattered me I might expect from it, viz. my attacks less frequent, my sufferings less acute, and an improvement in the general state of my health.

“ I have been particular in this account of myself at your request, and am, Sir, &c.

MORLEY, near DERBY,

February 10th, 1795.

ROBERT WILMOT.”

There are situations nevertheless in which a paroxysm of gout has been believed to be desirable,

able, as relieving the patient from other disagreeable diseases, or debilities, or sensations. Thus when the liver is torpid, a perpetual uneasiness and depression of spirits occur; which a fit of gout is supposed to cure by a metastasis of the disease. Others have acquired epileptic fits, probably from the disagreeable sensation of a chronically inflamed liver; which they suppose the pain and inflammation of gout would relieve. When gouty patients become much debilitated by the progress of the disease, they are liable to dropsy of the chest, which they suppose a fit of the gout would relieve. But in all these cases the attempt to procure a paroxysm of gout by wine, or aromatics, or volatiles, or blisters, or mineral waters, seldom succeeds; and the patients are obliged to apply to other methods of relief adapted to their particular cases. In the two former situations small repeated doses of calomel, or mercurial unction on the region of the liver, may succeed, by giving new activity to the vessels of the liver, either to secrete or to absorb their adapted fluids, and thus to remove the cause of the gout, rather than to promote a fit of it. In the last case the tincture of digitalis, and afterwards the class of forbentia, must be applied to.

M. M. In young strong patients the gout should be cured by venesection and cathartics and diluents, with poultices externally. But it has a natural

a natural crisis by producing calcareous matter on the inflamed membrane, and therefore in old enfeebled people it is safest to wait for this crisis, attending to the natural evacuations and the degree of fever; and in young ones, where it is not attended with much fever, it is customary and popular not to bleed, but only to keep the body open with aloes, to use gentle sudorifics, as neutral salts, and to give the bark at the decline of the fit; which is particularly useful where the patient is much debilitated. See Arthritis ventriculi, Class I. 2. 4. 6. and Sect. XXV. 17.

Mr. Kelly, surgeon in the navy, in an ingenious treatise, printed at Edinb. 1797, termed *Observations on Compression by the Tourniquet*, advises in both inflammatory and chronic rheumatism to compress the artery of the affected limb by the tourniquet, for 15 or 20 minutes, relaxing or tightening the bandage, as the patient seems to bear it. And in inflammatory rheumatism, he advises to take blood from a vein below the bandage, which he says relieves the pain and destroys the inflammation. Could not this experiment be used safely in the gout of young or strong patients? and perhaps with speedy success?

When there is not much fever, and the patient is debilitated with age, or the continuance of the disease, a moderate opiate, as twenty drops of tincture of opium, or one grain of solid opium,
may

may be taken every night with advantage. Externally a paste made with double the quantity of yeast is a good poultice; and booterkins made with oiled silk, as they confine the perspirable matter, keep the part moist and supple, and thence relieve the pain like poultices.

The only safe way of moderating the disease is by an uniform and equal diminution, or a total abstinence from fermented liquors, with the cautions directed in Sect. XII. 7. 8. The continued use of strong bitters, as of Portland's powder, or bark, has been frequently injurious, as spoken of in the *Materia Medica*, Art. IV. 2. 11.

One of my acquaintance, who was much afflicted with the gout, abstained for about half a year from beer and wine; and not having resolution to persist, returned to his former habits of potation in less quantity; and observed that he was then for one winter stronger and freer from the gout than usual. This however did not long continue, as the disease afterwards returned with its usual or increased violence. This I think is a circumstance not unlikely to occur, as opium has a greater effect after its use has been a while intermitted; and the debility or torpor, which is the cause of gout, is thus for a few months prevented by the greater irritability of the system, acquired during the lessened use of fermented liquor.

For

For the same reason an ounce of spirituous tincture of guaiacum, or of bark, is said to have for some time prevented returns of the gout; which has afterwards, like all other great stimuli when long continued, been succeeded by greater debility, and destroyed the patient. This seems to have been exemplified in the case of the ingenious Dr. Brown, see Preface to his *Elementa Medicinae*; he found temporary relief from the stimulus of wine, regardless of its future effects.

Lastly, as the gouty inflammation, like the rheumatic swellings of the wrists and ankles, is not a primary disease; and is like them not liable to suppurate; there is reason to believe that opiates may be given with less danger than in other inflammations, and with a prospect of advantage; since by preventing the periods of torpor of the liver, or other part, primarily affected, the diurnal additional attack, or its producing inflammation of another limb, may sometimes be prevented. A person a few days ago assured me, that when the gout came into his foot, his practice was to take thirty drops of tincture of opium; and in half an hour thirty drops more; and even a third dose, if the pain did not subside; and that the fit soon ceased. I should think this a dangerous experiment. A Mr. Warner wrote a book recommending opium in the gout, but died soon after its publication.

16. *Rheumatismus.*

16. *Rheumatismus.* Acute rheumatism. There is reason to suspect, that rheumatic inflammations, like the gouty ones, are not a primary disease; but that they are the consequence of a translation of morbid action from one part of the system to another. This idea is countenanced by the frequent change of place of rheumatic-like gouty inflammations, and from their attacking two similar parts at the same time, as both ankles and both wrists, and these attacks being in succession to each other. Whereas it is not probable that both feet or both hands should at the same time be equally exposed to any external cause of the disease, as to cold or moisture; and less so that these should occur in succession. Lastly, from the inflammatory diathesis in this disease being more difficult to subdue, and more dangerous in event, than other common inflammations, especially to pregnant women, and in weak constitutions.

From this idea of the rheumatism being not a primary disease, like the gout, but a transferred morbid action owing to the previous torpor of some other part of the system, we perceive why it attacks weak people with greater pertinacity than strong ones; resisting or recurring again and again after frequent evacuations, in a manner very different from primary inflammations; because the cause is not removed, which is at a distance from the seat of the inflammation.

This

This also accounts for rheumatic inflammations so very rarely terminating in suppuration, because like the gout the original cause is not in the inflamed part, and therefore does not continue to act after the inflammation commences. Instead of suppuration in this disease, as well as in the gout, a quantity of mucus or coagulable lymph is formed on the inflamed membrane; which in the gout changes into chalkstones, and in the rheumatism is either reabsorbed, or lies on the membrane, producing pains on motion long after the termination of the inflammation, which pains are called chronic rheumatism. The membranes, which have thus been once or repeatedly inflamed, become less mobile, or less liable to be affected by sympathy, as appears by the gout affecting new parts, when the joints of the foot have been frequently inflamed by it; hence as the cause of the inflammation does not exist in the inflamed part, and as this part becomes less liable to future attacks, it seldom suppurates.

Pleurodyne rheumatica. When rheumatism affects the muscles of the chest, it produces symptoms similar to pleurisy, but distinguished from it by the patient having previously suffered rheumatic affections in other parts, and by the pertinacity or continuance of the inflammatory state of the patient. This should be termed pleurodyne rheumatica.

Enteralgia rheumatica. When rheumatic inflammation

flammation affects the bowels, it produces a disease very different from enteritis, or common inflammation of the bowels, and should be termed enteralgia rheumatica. The pain is less than in enteritis, and the disease of longer continuance, with harder pulse, and the blood equally visy. It is attended with frequent dejections, with much mucus, and previous griping pains, but without vomiting; and differs perhaps from dysentery from its not being attended with bloody stools, and not being infectious.

Rheumatic inflammations, which I believe to arise from the sympathy of the inflamed part with the torpor of some distant part, may I think be certainly distinguished from those inflammations of the same part, which have not arisen from sympathy with the torpor of some distant part, but where the cause of the inflammation began in the part where the inflammation exists, by this circumstance; that in rheumatic inflammation the hard or sharp pulse continues at about 118 in a minute after the pain abates or ceases. Whereas in the latter the inflammatory fever ceases along with the pain.

In two cases of pain of the side, and difficult respiration, which I esteemed rheumatic, as the hard pulse of 118 with fixed blood continued after repeated venesection, gentle cathartics, and mild antimonials, I found ten drops of saturated tincture of digitalis given every six hours ap-

pear to produce great good effect, and to abate and remove the inflammatory diathesis in three or four days.

Hence when a fever has continued more than one lunar period, attended with a hard or sharp pulse of 118 or 120 in a minute, and is not attended with cough or symptoms of absorbed matter, it may be esteemed of rheumatic origin, though no local pain or inflammation at present exists; and this with greater certainty, if pain had previously existed: for no fevers, except the hectic fevers from absorbed matter, and this attended with inflammatory diathesis, and which may be called rheumatic, ever properly extend, I believe, beyond one lunation; though symptoms of debility may continue a while longer. This observation is worth attending to in practice, as it distinguishes the kind of fever, in which when the bark is erroneously given, it does no service, and in which I believe saturated tincture of digitalis given as above to be the most efficacious medicine.

Rheumatismus suppurans. There is another kind of rheumatism attended with debility, which suppurates, and should be termed *rheumatismus suppurans*. It is generally believed to be the gout; till suppuration takes place on the swelled joint; and, as the patient sinks, there are sloughs formed over the whole mouth; and he seems to be destroyed by inflammation or gangrene of the mucous

mucous membranes. I have twice seen this disease in patients about sixty. Some other diseases are erroneously called rheumatic, as hemi-crания, and odontalgia. See Sect. XXVI. 3.

M. M. In the three former kinds venesection repeatedly. Cathartics. Antimonials. Diluents. Neutral salts. Oil. Warm bath. Afterwards the bark. Opium with or without ipecacuanha; but not till the patient is considerably weakened. Sweats forced early in the disease do injury. Opium given early in the disease prolongs it. In the last kind, gentle stimulants, as wine and water, mucilage, sorbentia.

In acute rheumatism, when the swelling of the joints first affected subsides, a return of torpor in the part primarily diseased commences previous to an inflammation of the joints secondarily affected. Hence when the tumor of the joints first affected subsides, half a grain of opium, every night, and Peruvian bark, or other bitter medicine, may be given to prevent this return of torpor with great advantage; if the patient has previously been properly evacuated, and is not now too much inflamed.

Dr. Fordyce asserts, that when it was the practice to bleed largely in acute rheumatism, a metastasis frequently took place to the interior parts of the body, and destroyed the patient. And adds, that during the last fifteen years of his practice this has rarely happened, as he has en-

Q. 2 **tirely**

tirely left off bleeding in the acute rheumatism. Third dissertation on fever by G. Fordyce, M. D. London, Johnson. On this subject it may be remarked, that as rheumatism like gout is a secondary disease, the inflammation of one part being symptomatic, the seat of torpor existing in some other part, it may not be so constantly necessary to bleed so copiously in those secondary inflammatory diseases, as in those primary ones, where the inflamed part was previously the seat of torpor, as in pleurisy, peripneumony, and enteritis; but in rheumatism, as well as in erysipelas, I am convinced, that where the inflammation of the system is great, repeated venesection is not only useful; but that those, who perish by either of those diseases, perish for the want of venesection early, where the attack is violent. And lastly, that even in the gout of young and strong subjects, as I know by experience on myself, a moderate venesection shortens the fit, and lessens I believe the hazard of metastasis.

The following is a case of suppurative rheumatism. Mr. F—, about sixty, was supposed to have the gout in his hand, which however suppurated, and it was then called the suppurative rheumatism. He had lived rather intemperately in respect to wine, and was now afflicted with a tendency to inflammation of the mucous membranes. As he lay on the bed half resupine, propped up with pillows, and also slept in that posture,

posture, his lower jaw dropped by its own weight, when the voluntary power of the muscles was suspended. The mucos of his mouth and throat became quite dry, and at length was succeeded by sloughs; this was a most distressing circumstance to him, and was in vain endeavoured to be relieved by supporting his jaw by slender steel springs fixed to his night-cap, and by springs of elastic gum. The sloughs spread and seemed to accelerate his death. See Class I. 3. 2.

In acute rheumatism Mr. Kellie asserts that he has had great success by putting a tourniquet on the affected limb, so as to compress the artery, and then by taking blood from a vein below the bandage, as mentioned above in Podagra. Class IV. 1. 2. 15.

17. *Erysipelas.* The erysipelas differs from the zona ignea, and other species of herpes, in its being attended with fever, which is sometimes of the sensitive irritated or inflammatory kind, with strong and full pulse; and at other times with weak pulse and great inirritability, as when it precedes or attends mortifications. See Class II. 1. 3. 2.

Like the zona ignea above described, it seems to be a secondary disease, having for its primary part the torpor or inflammation of some internal or distant membrane, as appears from its so frequently attending wounds; sometimes spreading

Q 3 from

from issues over the whole limb, or back, by sympathy with a tendon or membrane, which is stimulated by the palse in them. In its more violent degree I suppose that it sympathizes with some extensive internal membranes, as of the liver, stomach, or brain. Another reason, which countenances this idea, is, that the inflammation gradually changes its situation, one part healing as another inflames; as happens in respect to more distant parts in gout and rheumatism; and which seems to shew, that the cause of the disease is not in the same place with the inflammation. And thirdly, because the erysipelas of the face and head is liable to affect the membranes of the brain; which were probably in these cases the original or primary seat of the disease; and lastly, because the fits of erysipelas, like those of the gout, are liable to return at certain annual or monthly periods, as further treated of in Class II, I. 3. 2.

Many cases of erysipelas from wounds or bruises are related in Desault's Surgical Journal, Vol. II. in which poultices are said to do great injury, as well as oily or fatty applications. Saturine solutions were sometimes used with advantage. A grain of emetic tartar given to clear the stomach and bowels, is said to be of great service.

18. *Testium tumor in gonorrhœa.* Mr. Hunter in his Treatise on the Venereal Disease observes, that

that the tumor of the testes in gonorrhœa arises from their sympathy with the inflammation of the urethra; and that they are not similar to the actions arising from the application of venereal matter, whether by absorption or otherwise; as they seldom or never suppurate; and when suppuration happens, the matter produced is not venereal. *Treatise on Venereal Disease*, p. 53.

19. *Testium tumor in parotidite.* The sympathy between some parts about the throat and the genitals has been treated of in Class IV. 1. 2. 7. The swelling of the testes, when that of the parotis subsides, seems to arise from the association of successive action; as the tension of the penis in hydrophobia appears to arise from the previous synchronous associations of the sensitive motions of these parts; but the manner of the production of both these associations is yet very obscure. In women a swelling of the breasts often succeeds the decline of the mumps by another wonderful sympathy. See Class IV. 1. 2. 7. and I. 1. 2. 15. In many persons a delirium succeeds the swelling of the parotis, or the subsequent ones of the testes or breasts; which is sometimes fatal, and seems to arise from a sympathy of successive action, and not of synchronous action, of the membranes of the brain with those of the parotid glands. Sometimes a stupor comes on instead of this delirium, which is relieved by fomenting the shaved head for an hour or two. See Class II. 1. 3. 4.

ORDO I.

Increased Associate Motions.

GENUS III.

Catenated with Voluntary Motions.

SPECIES.

1. *Deglutitio invita.* When any one is told not to swallow his saliva, and that especially if his throat be a little sore, he finds a necessity of immediately swallowing it; and this the more certainly, the more he voluntarily endeavours not to do so.

In this case the voluntary power exerted by our attention to the pharynx renders it more sensible to irritation, and therefore occasions it to be more frequently induced to swallow the saliva. Here the irritation induces a volition to swallow it, which is more powerful than the desire not to swallow it. See XXIV. 1. 7. So in reverie, when the voluntary power was exerted on any of the senses, as of sight or taste, the objects of those senses became perceived; but not otherwise. Sect. XIX, 6. This is a troublesome symptom in some sore throats.

M. M. Mucilage, as sugar and gum arabic.

Warm water held in the mouth frequently, as a fomentation to the inflamed throat.

2. *Nictitatio invita.* Involuntary winking with the eye-lids, and twitchings of the face, are originally induced by an endeavour to relieve some disagreeable sensations about inflamed eyes, as the dazzling of light; and afterwards these motions become catenated with other motions or sensations, so as not to be governed by the will. Here the irritation first produces a volition to wink, which by habit becomes stronger than the antivolition not to wink.

This subject is rendered difficult from the common acceptation of the word, volition, including previous deliberation, as well as the voluntary exertion, which succeeds it. In the volitions here spoken of there is no time for deliberation or choice of objects, but the voluntary act immediately succeeds the sensation which excites it.

M. M. Cover the affected parts with a sticking plaster or a blister. Pass a fine needle and thread through a part of the skin over the muscle, which moves, and attach the other end of the thread by a sticking plaster to a distant part. An issue behind the ear. To practise daily by a looking-glass to stop the motions with the hand. See the cure of a case of the leaping of a muscle of the arm, Sect. XVII. 1. 8. See *Convulsio debilis*, Class III. 1. 1. 5. Frequent electric sparks, or very slight shocks.

3. *Rixus*

3. *Risus invitus.* Involuntary laughter. When the pleasure arising from new combinations of words, and ideas, as in puns; or of other circumstances, which are so trivial, as to induce no voluntary exertion to compare or consider their present importance or their future consequence; the pleasure is liable to rise into pain; that is, the ideas or sensual motions become exerted too violently for want of some antithetic ideas; in the same manner as those muscles, which have weak antagonists, as those of the calf of the leg, are liable to fall into cramp or painful contraction. In this situation a scream is begun to relieve this pain of ideas too violently exerted, which is stopped again soon, as explained in Sect. XXXIV. 1. 4, and Class III. 1. 1. 4. and IV. 2. 3. 3.

The pain, into which this pleasure rises, which would excite the scream of laughter, has been felt forcibly by every one; when they have been under such circumstances, as have induced them to restrain it by a counter-volition; till at length the increased associate motions produce so much pain as to overcome the counter-volition, and the patient bursts out into indecent laughter, contrary to his will in the common acceptation of that word.

4. *Layus digitorum invitus.* An awkward playing with the fingers in speaking in public. These habits are begun through bashfulness, and seem rather

rather at first designed to engage the attention in part, and thus prevent the disagreeable ideas of mauvaise honte; as timorous boys whistle, when they are obliged to walk in the dark; and as it is sometimes necessary to employ raw soldiers in perpetual manœuvres, as they advance to the first charge.

5. *Unguium morstuncula invita.* Biting the nails is a depraved habit arising from similar causes as those of the last article.

M. M. Dip the fingers in solution of aloes.

6. *Vigilia invita.* Watchfulness, where the person wishes and endeavours to fall asleep, properly belongs to this place, as the wish or volition to sleep prevents the desired effect; because sleep consists in an abolition of volition. See Class III.

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ORDO

ORDO I.

Increased Associate Motions.

GENUS IV.

Catenated with External Influences.

SPECIES.

1. *Vita ovi.* Life of an egg. The eggs of fowls were shewn by Mr. J. Hunter to resist the freezing process in their living state more powerfully, than when they were killed by having the yolk and white shook together. *Philos. Trans.* It may be asked, does the heat during the incubation of eggs act as a stimulus exciting the living principle into activity? Or does it act simply as a *causa sine quâ non*, as an influence, which penetrating the mass, removes the particles of it to a greater distance from each other, so as to allow their movement over each other, in the same manner as heat is conceived to produce the fluidity of water; not by stimulus, but by its penetrating influence? Or may elementary heat in its uncombined state be supposed to act only as an influence necessary to life in its natural quantity; whence torpor and death follow the education of it from the body; but in its increased state above what is natural, or usual, that it acts as a stimulus;

stimulus; which we have a sense to perceive; and which excites many parts of the system into unnatural action? See Class IV. I. 1. C.

2. *Vita hiberni-dormientium.* The torpor of insects, and birds, and quadrupeds, during the cold season, has been called sleep; but I suppose it must differ very much from that state of animal life, since not only all voluntary power is suspended, but sensation and vascular motion have ceased, and can only be restored by the influence of heat. There have been related instances of snails, which have recovered life and motion on being put into water after having experienced many years of torpidity, or apparent death, in the cabinets of the curious. Here the water as well as the heat are required not only as a stimulus, but as a causa sine qua non of fluidity and motion, and consequent life.

3. *Pullulatio arborum.* The annual revivescence of the buds of trees seems not only to be owing to the influence of the returning warmth of the spring, but also to be catenated with solar gravitation; because seeds and roots and buds, which are analogous to the eggs of animals, put forth their shoots by a less quantity of heat in spring, than they had undergone in the latter part of autumn, which may however be ascribed to their previous torpid state, and consequent accumulation

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tion of sensorial power, or irritability; as explained in Botanic Garden, Part II. Cant. I. l. 322. note. Other circumstances, which countenance the idea, that vegetation is affected by solar gravitation, as well as by heat, may be observed in the ripening of the seeds of plants both in those countries where the summers are short, and in those where they are long. And by some flowers closing their bells at noon, or soon after; and hence seem to sleep rather at solar diurnal periods, than from the influence of cold, or the deficiency of light.

4. *Orgasmatis venerei periodus.* The venereal orgasm of birds and quadrupeds commences or returns about the vernal or autumnal equinoxes, and thence seems in respect to their great periods to be governed by solar influence. But if this orgasm be disappointed of its object, it is said to recur at about monthly periods, as observed in mares and bitches, in this respect resembling the female catamenia. See Sect. XXXVI. 2. 3. and Sect. XVI. 13.

5. *Brachii concusso-electrica.* The movement of the arm, even of a paralytic patient, when an electric shock is passed through it, is owing to the stimulus of the excess of electricity. When a piece of zinc and another of silver, each about the size of a crown-piece, are placed one under the upper lip, and

and the other on the tongue, so as the outer edges may be brought into contact, there is an appearance of light in the eyes, as often as the outer edges of these metals are brought into contact or separated; which is another instance of the stimulus of the passage of electric shocks through the fibres of the organs of sense, as well as through the muscular fibres. See Sect. XII. I. 1. But in its natural state electricity seems only to act as an influence on animal and vegetable bodies; of the salutary or injurious effects of which we have yet no precise knowledge.

Yet if regular journals were kept of the variations of atmospheric electricity, it is probable some discoveries of its influence on our system might in time be discovered. For this purpose a machine on the principle of Mr. Bennet's electric dobbler might be applied to the pendulum of a clock, so as to manifest, and even to record the daily or hourly variations of aerial electricity. Which has already been executed, and applied to the pendulum of a Dutch wooden clock, by Mr. Bennet, curate of Wirksworth in Derbyshire.

Besides the variations of the degree or kind of atmospheric electricity, some animals, and some men, seem to possess a greater power of accumulating this fluid in themselves than others. Of which a famous history of a Russian prince was lately published; who, during the clear and severe frosts of that country, could not move him-

self in bed without luminous corruscations. Such may have been the case of those people, who have been related to have taken fire spontaneously, and to have been reduced to ashes. The electric concussion from the *gymnotus electricus*, and *torpedo*, are other instances of the power of the animal system to accumulate electricity, as in these it is used as a weapon of defence, or for the purpose of taking their prey.

Some have believed that the accumulation or passage of the magnetic fluid might affect the animal system, and have asserted that the application of a large magnet to an aching tooth has quickly effected a cure. If this experiment is again tried in *odontalgia*, or *hemicrania*, the painful membrane of the tooth or head should be included between the south and north poles of a horse-shoe magnet, or between the contrary poles of two different magnets, that the magnetism may be accumulated on the torpid part.

6. *Oxygenatio sanguinis*. The variation of the quantity of oxygen gas existing in the atmosphere must affect all breathing animals; in its excess this too must be esteemed a stimulus; but in its natural quantity would seem to act as an influence, or cause, without which animal life cannot exist even a minute. It is hoped that Dr. Beddoes's plan for a pneumatic infirmary, for the purpose of

of putting this and various other airs to the test of experiment, will meet with public encouragement, and render consumption, asthma, cancer, and many diseases conquerable, which at present prey with unremitting devastation on all orders and ages of mankind.

7. *Humectatio corporis.* Water, and probably the vapour of water dissolved or diffused in the atmosphere, unites by mechanical attraction with the unorganized cuticle, and softens and enlarges it; as may be seen in the loose and wrinkled skin of the hands of washerwomen; the same probably occurs to the mucous membrane of the lungs in moist weather; and by thickening it increases the difficulty of respiration of some people, who are said to be asthmatical. So far water may be said to act as an influx or influence, but when it is taken up by the mouths of the absorbent system, it must excite those mouths into action, and then acts as a stimulus.

There appears from hence to be four methods by which animal bodies are penetrated by external things. 1. By their stimulus, which induces the absorbent vessels to imbibe them. 2. By mechanical attraction, as when water softens the cuticle. 3. By chemical attraction, as when oxygen passes through the membranes of the air-vessels of the lungs, and combines with the blood. And lastly, by influx without me-

chanical attraction, chemical combination, or animal absorption, as the universal fluids of heat, gravitation, electricity, magnetism, and perhaps of other ethereal fluids yet unknown.

ORDO.

ORDO II.

Decreased Associate Motions.

GENUS I.

Catenated with irritative Motions.

As irritative muscular motions are attended with pain, when they are exerted too weakly, as well as when they are exerted too strongly; so irritative ideas become attended with sensation, when they are exerted too weakly, as well as when they are exerted too strongly. Which accounts for these ideas being attended with sensation in the various kinds of vertigo described below.

There is great difficulty in tracing the immediate cause of the deficiencies of action of some links of the associations of irritative motions; first, because the trains and tribes of motions, which compose these links, are so widely extended as to embrace almost the whole animal system; and secondly, because when the first link of an associated train of actions is exerted with too great energy, the second link by reverse sympathy may be affected with torpor. And then this second link may transmit, as it were, this torpor to a third link, and at the same time regain its own energy of action; and it is possible this third link may in like manner transmit its torpor to a

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fourth,

fourth, and thus regain its own natural quantity of motion.

I shall endeavour to explain this by an example taken from sensitive associated motions, as the origin of their disturbed actions is more easily detected. This morning I saw an elderly person, who had gradually lost all the teeth in his upper jaw, and all of the under except three of the molares; the last of these was now loose, and occasionally painful; the fangs of which were almost naked, the gums being much wasted both within and without the jaw. He is a man of attentive observation, and assured me, that he had again and again noticed, that, when a pain commenced in the membranes of the alveolar process of the upper jaw opposite to the loose tooth, in the under one (which had frequently occurred for several days past), the pain of the loose tooth ceased. And that, when the pain afterwards extended to the ear and temple on that side, the pain in the membranes of the upper jaw ceased. In this case the membranes of the alveolar process of the upper jaw became torpid, and consequently painful, by their reverse sympathy with the too violent actions of the inflamed membranes of the loose tooth; and then by a secondary sympathy the membranes about the ear and temple became torpid, and painful; and those of the alveolar process of the upper jaw regained their natural quantity of action, and ceased

ceased to be painful. A great many more nice and attentive observations are wanted to elucidate these curious circumstances of association, which will be found to be of the greatest importance in the cure of many diseases, and lead us to the knowledge of fever.

S P E C I E S.

1. *Cutis frigida pranorum.* Chillness after dinner frequently attends weak people, or those who have been exhausted by exercise; it arises from the great expenditure of the sensorial power on the organs of digestion, which are stimulated into violent action by the aliment; and the vessels of the skin, which are associated with them, become in some measure torpid by reverse sympathy; and a consequent chillness succeeds with less absorption of atmospheric moisture. See the subsequent article.

2. *Pallor urinæ pranorum.* The paleness of urine after a full meal is an instance of reverse association; where the secondary part of a train of associate motions acts with less energy in consequence of the greater exertions of the primary part. After dinner the absorbent vessels of the stomach and intestines are stimulated into greater action, and drink up the newly taken aliment; while those, which are spread in great number

on the neck of the bladder, absorb less of the aqueous part of the urine than usual, which is therefore discharged in a more dilute state; and has been termed crude by some medical writers, but it only indicates, that so great a proportion of the sensorial power is expended on digestion and absorption of the aliment, that other parts of the system act for a time with less energy. See Class IV. 1. 1. 6.

3. *Pallor urinæ a frigore cutaneo.* There is a temporary discharge of pale water, and a diarrhoea, induced by exposing the skin to the cold air; as is experienced by boys, who strip themselves before bathing. In this case the mouths of the cutaneous lymphatics become torpid by the subduction of their accustomed degree of heat, and those of the bladder and intestines become torpid by direct sympathy; whence less of the thinner part of the urinary secretion, and of the mucus of the intestines, is reabsorbed. See Sect. XXIX. 4. 6. This effect of suddenly cooling the skin by the aspersion of cold water has been used with success in costiveness, and has produced evacuations, when other means have failed. When young infants are afflicted with griping joined with costiveness, I have sometimes directed them to be taken out of a warm bed, and carried about for a few minutes in a cool room, with almost instant relief.

4. *Pallor*

4. *Pallor ex ægritudine.* When sickness of stomach first occurs, a paleness of the skin attends it; which is owing to the association or catenation between the capillaries of the stomach and the cutaneous ones; which at first act by direct sympathy. But in a short time there commences an accumulation of the sensorial power of association in the cutaneous capillaries during their state of inactivity, and then the skin begins to glow, and sweats break out, from the increased actions of the cutaneous glands or capillaries, which is now in reverse sympathy with those of the stomach. So in continued fevers, when the stomach is totally torpid, which is known by the total aversion to solid food, the cutaneous capillaries are by reverse sympathy in a perpetual state of increased activity, as appears from the heat of the skin.

5. *Dyspnaæ a balneo frigido.* The difficulty of breathing on going up to the middle in cold water is owing to the irritative association or catenation of the action of the extreme vessels of the lungs with those of the skin. So that when the latter are rendered torpid or inactive by the application of sudden cold, the former become inactive at the same time, and retard the circulation of the blood through the lungs, for this difficulty of breathing cannot be owing to the pressure of the water impeding the circulation downwards,

as it happens equally by a cold shower-bath, and is soon conquered by habitual immersions. The capillaries of the skin are rendered torpid by the subduction of the stimulus of heat, and by the consequent diminutions of the sensorial power of irritation. The capillaries of the lungs are rendered torpid by the diminution of the sensorial power of association, which is now excited in less quantity by the lessened actions of the capillaries of the skin, with which they are catenated. So that at this time both the cutaneous and pulmonary capillaries are principally actuated, as far as they have any action, by the stimulus of the blood. But in a short time the sensorial powers of irritation, and of association, become accumulated, and very energetic action of both these membranes succeeds. Which thus resemble the cold and hot fit of an intermittent fever.

6. *Dyspepsia a pedibus frigidis.* When the feet are long cold, as in riding in cold and wet weather, some people are very liable to indigestion and consequent heart-burn. The irritative motions of the stomach become torpid, and do their office of digestion imperfectly, in consequence of their association with the torpid motions of the vessels of the extremities. Fear, as it produces paleness and torpidity of the skin, frequently occasions temporary indigestion in consequence of this association of the vessels of the

the skin with those of the stomach; as riding in very bad roads will give flatulency and indigestion to timorous people.

A short exposure to cold air increases digestion, which is then owing to the reverse sympathy between the capillary vessels of the skin, and of the stomach. Hence when the body is exposed to cold air, within certain limits of time and quantity, a reverse sympathy of the stomach and the skin first occurs, and afterwards a direct sympathy. In the former case the expenditure of sensorial power by the skin being lessened, but not its production in the brain; the second link of the association, viz. the stomach, acquires a greater share of it. In the latter case, by the continuation of the deficient stimulus of heat, the torpor becomes extended to the brain itself, or to the trunks of the nerves; and universal inactivity follows.

7. *Tussis a pedibus frigidis.* On standing with the feet in thawing snow, many people are liable to incessant coughing. From the torpidity of the absorbent vessels of the lungs, in consequence of their irritative associations with those of the skin, they cease to absorb the saline part of the secreted mucus; and a cough is thus induced by the irritation of this saline secretion; which is similar to that from the nostrils in frosty weather, but differs in respect to its immediate cause; the former

former being from association with a distant part, and the latter from defect of the stimulus of heat on the nostrils themselves. See *Catarrhus frigidus*, Class I. 2. 3. 3.

8. *Tussis hepatica*. The cough of inebriates, which attends the enlargement of the liver, or a chronic inflammation of its upper membrane, is supposed to be produced by the inconvenience the diaphragm suffers from the compression or heat of the liver. It differs however essentially from that attending hepatitis, from its not being accompanied with fever. And is perhaps rather owing to irritative association, or reverse sympathy, between the lungs and the liver. As occurs in sheep, which are liable to a perpetual dry cough, when the fleuk-worm is preying on the substance of their livers. See Class II. 1. 1. 5.

M. M. From half a grain to a grain of opium twice a day. A drachm of mercurial ointment rubbed on the region of the liver every night for eight or ten times.

9. *Tussis arthritica*. Gout-cough. I have seen a cough, which twice recurred at a few years distance in the same person, during his fits of the gout, with such pertinacity and violence as to resist venesection, opiates, bark, blisters, mucilages, and all the usual methods employed in coughs. It was for a time supposed to be the hooping-cough,

cough, from the violence of the action of coughing; it continued two or three weeks, the patient never being able to sleep more than a few minutes at once during the whole time, and being propped up in bed with pillows night and day.

As no fever attended this violent cough, and but little expectoration, and that of a thin and frothy kind, I suspected the membrane of the lungs to be rather torpid than inflamed, and that the saline part of the mucus not being absorbed stimulated them into perpetual exertion. And lastly, that though the lungs are not sensible to cold and heat, and probably therefore less mobile, yet, as they are nevertheless liable to consent with the torpor of cold feet, as described in Species 6 of this Genus, I suspected this torpor of the lungs to succeed the gout in the feet, or to act a vicarious part for them.

10. *Vertigo rotatoria.* In the vertigo from circumgyration the irritative motions of vision are increased; which is evinced from the pleasure that children receive on being rocked in a cradle, or by swinging on a rope. For whenever sensation arises from the production of irritative motion with less energy than natural, it is of the disagreeable kind, as from cold or hunger; but when it arises from their production with greater energy than natural, if it be confined within certain

tain limits, it is of the pleasurable kind, as by warmth or wine. With these increased irritative motions of vision, I suppose those of the stomach are performed with greater energy by direct sympathy; but when the rotatory motions, which produce this agreeable vertigo, are continued too long, or are too violent, sickness of the stomach follows; which is owing to the decreased action of that organ from its reverse sympathy with the increased actions of the organ of vision. For the expenditure of sensorial power by the organ of vision is always very great, as appears by the size of the optic nerves; and is now so much increased as to deprive the next link of association of its due share. As mentioned in Species 6 of this Genus.

In the same manner the undulations of water, or the motions of a ship, at first give pleasure by increasing the irritative motions belonging to the sense of vision; but produce sickness at length by expending on one part of the associated train of irritative actions too much of that sensorial power, which usually served the whole of it; whence some other parts of the train acquire too little of it, and perform their actions in consequence too feebly, and thence become attended with disagreeable sensation.

It must also be observed, that when the irritative motions are stimulated into unusual action, as in inebriation, they become succeeded by sen-

sation, either of the pleasurable or painful kind; and thus a new link is introduced between the irritative motions thus excited, and those which used to succeed them; whence the association is either dissevered or much weakened, and thus the vomiting in sea-sickness occurs from the defect of the power of association, rather than from the general deficiency of sensorial power.

When a blind man turns round, or when one, who is not blind, revolves in the dark, a vertigo is produced belonging to the sense of touch. A blind man balances himself by the sense of touch, which being a less perfect means of determining small quantities of deviation from the perpendicular, occasions him to walk more carefully upright than those, who balance themselves by vision. When he revolves, the irritative associations of the muscular motions, which were used to preserve his perpendicularity, become disordered by their new modes of successive exertion; and he begins to fall. For his feet now touch the floor in manners or directions different from those they have been accustomed to; and in consequence he judges less perfectly of the situation of the parts of the floor in respect to that of his own body, and thus loses his perpendicular attitude. This may be illustrated by the curious experiment of crossing one finger over the next to it, and feeling a nut or bullet with the ends of them. When, if the eyes be closed, the nut or bullet appears

pears to be two, from the deception of the sense of touch.

In this vertigo from gyration, both of the sense of sight, and of the sense of touch, the primary link of the associated irritative motions is increased in energy, and the secondary ones are increased at first by direct sympathy; but after a time they become decreased by reverse sympathy with the primary link, owing to the exhaustion of sensorial power in general, or to the power of association in particular; because in the last case, either pleasurable or painful sensation has been introduced between the links of a train of irritative motions, and has dissevered, or much enfeebled them.

Dr. Smyth, in his Essay on Swinging in Pulmonary Consumption, has observed, that swinging makes the pulse slower. Dr. Ewart of Bath confirmed this observation both on himself and on Col. Cathcart, who was then hectic, and that even on shipboard, where some degree of vertigo might be supposed previously to exist. Dr. Currie of Liverpool not only confirmed this observation frequently on himself, when he was also phthisical, but found that equitation had a similar effect on him, uniformly retarding his pulse. This curious circumstance cannot arise from the general effect of exercise, or fatigue, as in those cases the pulse becomes weaker and quicker; it must therefore be ascribed to a degree

of vertigo, which attends all those modes of motion, which we are not perpetually accustomed to.

Dr. Currie has further observed, that "in cases of great debility the voluntary muscular exertion requisite in a swing produces weariness, that is, increases debility; and that in such instances he had frequently noticed, that the diminution of the frequency of the pulse did not take place, but the contrary." These circumstances may thus be accounted for.

The links of association, which are effected in the vertigo occasioned by unusual motion, are the irritative motions of the sense of vision, those of the stomach, and those of the heart and arteries. When the irritative ideas of vision are exerted with greater energy at the beginning of vertigo, a degree of sensation is excited, which is of the pleasurable kind, as above mentioned; whence the associated trains of irritative motions of the stomach, and heart, and arteries, act at first with greater energy, both by direct sympathy, and by the additional sensorial power of sensation. Whence the pulse of a consumptive patient becomes stronger and consequently slower.

But if this vertigo becomes much greater in degree or duration, the first link of this train of associated irritative motions expends too much of the sensorial power, which was usually employed on the whole train; and the motions of the stomach

mach become in consequence exerted with less energy. This appears, because in this degree of vertigo sickness supervenes, as in sea-sickness, which has been shewn to be owing to less energetic action of the stomach. And the motions of the heart and arteries then become weaker, and in consequence more frequent, by their direct sympathy with the lessened actions of the stomach. See Supplement, I. 12. and Class II. L 6. 7. The general weakness from fatigue is owing to a similar cause, that is, to the too great expenditure of sensorial power in the increased actions of one part of the system, and the consequent deficiency of it in other parts, or in the whole.

The abatement of the heat of the skin in hectic fever by swinging, is not only owing to the increased ventilation of cool air, but to the reverse sympathy of the motions of the cutaneous capillaries with those of the heart and arteries ; which occurs in all fevers with arterial debility, and a hot or dry skin. Hence during moderate swinging the action of the heart and arteries becomes stronger and flower, and the action of the capillaries, which was before too great, as appeared by the heat of the skin, is now lessened by their reverse sympathy with that of the heart and arteries. See Supplement, I. 8.

11. *Vertigo visualis.* Visual vertigo. The vertigo rotatoria described above, was induced by the rotation or undulation of external objects, and

and was attended with increased action of the primary link of the associated motions belonging to vision, and with consequent pleasure. The vertigo visualis is owing to less perfect vision, and is not accompanied with pleasurable sensation. This frequently occurs in strokes of the palsy, and is then succeeded by vomiting; it sometimes precedes epileptic fits, and often attends those, whose sight begins to be impaired by age.

In this vertigo the irritative ideas of the apparent motions of objects are less distinct, and on that account are not succeeded by their usual irritative associations of motion; but excite our attention. Whence the objects appear to librate or circulate according to the motions of our heads, which is called dizziness; and we lose the means of balancing ourselves, or preserving our perpendicularity, by vision. So that in this vertigo the motions of the associated organs are decreased by direct sympathy with their primary link of irritation; as in the preceding case of sea-sickness they are decreased by reverse sympathy.

When vertigo affects people about fifty years of age, their sight has generally been suddenly impaired; and from their less accurate vision they do not soon enough perceive the apparent motions of objects; like a person in a room, the walls of which are stained with the uniform figures of lozenges, explained in Sect. XX. 1. This is generally ascribed to indigestion; but it

ceases spontaneously, as the patient acquires the habit of balancing himself by less distinct objects.

A gentleman about 50 was seized with an uncommon degree of vertigo, so as to fall on the ground, and not to be able to turn his head, as he sat up either in his chair or in his bed, and this continued eight or ten weeks. As he had many decayed teeth in his mouth, and the vertigo was preceded and sometimes accompanied by pains on one side of his head, the disease of a tooth was suspected to be the cause. And as his timidity was too great to admit the extraction of those which were decayed; after the trial of cupping repeatedly, fomentations on his head, repeated blisters, with valerian, Peruvian bark, musk, opium, and variety of other medicines; mercurials were used, both externally and internally, with design to inflame the membranes of the teeth, and by that means to prevent the torpor of the action of the membranes about the temple, and parietal bone; which are catenated with the membranes of the teeth by irritative association, but not by sensitive association. The event was, that as soon as the gums became sore with a slight ptyalism, the pains about the head and vertigo gradually diminished, and during the soreness of his gums entirely ceased; but I believe recurred afterwards, though in less degree.

The idea of inflaming the membranes of the teeth

teeth to produce increased sensation in them, and thus to prevent their irritative connexion with those of the cranium, was taken from the treatment of trismus, or locked jaw; by endeavouring to inflame the injured tendon; which is said to prevent or to remove the spasm of the muscles of the jaw. See Class III. 1. 1. 13. and 15.

M. M. Emetics. Blisters. Issues about the head. Extraction of decayed teeth. Slight salivation. Sorbentia. Incitantia. Galvanism.

A lady was suddenly seized with violent vertigo, so as to prevent her from walking safely across the room, this was attended with considerable diminution of sight; and after various evacuations, and other medicines, had been tried without cure, Mr. Volta's galvanic pillar was used, consisting of about 30 plates of silver, the diameter of about one inch and half, and as many zinc plates, with interposed circles of cloth moistened with brine. A wire connected with each end of this pillar was approached repeatedly to her temples, which were previously moistened with brine, and 100 galvanic shocks were daily passed through the optic nerves, which soon appeared to be of great advantage, and she soon recovered, both from the vertigo and dimness of sight.

12. *Vertigo ebriosa.* Vertigo from intoxication is owing to the association of the irritative ideas

of vision with the irritative motions of the stomach. Whence when these latter become much increased by the immoderate stimulus of wine, the irritative motions of the retina are produced with less energy by reverse sympathy, and become at the same time succeeded by sensation in consequence of their decreased action. See Sect. XXI. 3. and XXXV. 1. 2. So conversely when the irritative motions of vision are increased by turning round, or by our unaccustomed agitation at sea, those of the stomach become inverted by reverse sympathy, and are attended in consequence with disagreeable sensation. Which decreased action of the stomach is in consequence of the increased expenditure of the sensorial power on the irritative ideas of vision, as explained in *Vertigo rotatoria*.

Whence though a certain quantity of vinous spirit stimulates the whole system into increased action, and perhaps even increases the secretion of sensorial power in the brain; yet as soon as any degree of vertigo is produced, it is a proof, that by the too great expenditure of sensorial power by the stomach, and its nearest associated motions, the more distant ones, as those of vision, become imperfectly exerted. From hence may be deduced the necessity of exhibiting wine in fevers with weak pulse in only appropriated quantity; because if the least intoxication be induced, some part of the system must act more feebly

feeble from the unnecessary expenditure of sensorial power.

13. *Vertigo febriculosa.* Vertigo in fevers either proceeds from the general deficiency of sensorial power belonging to the irritative associations, or to a greater expenditure of it on some links of the trains and tribes of associated irritative motions. There is however a slighter vertigo attending all people, who have been long confined in bed, on their first rising; owing to their having been so long unused to the apparent motions of objects in their erect posture, or as they pass by them, that they have lost in part the habit of balancing themselves by them.

14. *Vertigo cerebrosa.* Vertigo from injuries of the brain, either from external violence, or which attend paralytic attacks, are owing to the general deficiency of sensorial power. In these distressful situations the vital motions, or those immediately necessary to life, claim their share of sensorial power in the first place, otherwise the patient must die; and those motions, which are less necessary, feel a deficiency of it, as these of the organs of sense and muscles; which constitute vertigo; and lastly the voluntary motions, which are still less immediately necessary to life, are frequently partially destroyed, as in palsy; or totally, as in apoplexy.

15. *Murmur aurium vertiginosum.* The vertiginous murmur in the ears, or noise in the head, is compared to the undulations of the sound of bells, or to the humming of bees. It frequently attends people about 60 years of age; and like the visual vertigo described above is owing to our hearing less perfectly from the gradual inirritability of the organ on the approach of age; and the disagreeable sensation of noise attending it is owing to the less energetic action of these irritative motions; which not being sufficiently distinct to excite their usual associations become succeeded by our attention, like the indistinct view of the apparent motions of objects mentioned in vertigo visualis. This may be better understood from considering the use, which blind men make of these irritative sounds, which they have taught themselves to attend to, but which escape the notice of others. The late blind Justice Fielding walked for the first time into my room, when he once visited me, and after speaking a few words said, "This room is about 22 feet long, 18 wide, and 12 high;" all which he guessed by the ear with great accuracy. Now if these irritative sounds from the partial loss of hearing do not correspond with the size or usual echoes of the places, where we are; their connection with other irritative ideas, as those of vision, becomes disengaged or disturbed; and we attend to them in consequence, which I think unravels this intricate circumstance

circumstance of noises being always heard in the head, when the sense of hearing begins to be impaired, from whatever cause it occurs.

This ringing in the ears also attends the vertigo from intoxication; for the irritative ideas of sound are then more weakly excited in consequence of the deficiency of the sensorial power of association. As is known by this also being attended with disagreeable sensation, and by its accompanying other diseases of debility, as strokes on the head, fainting fits, and paralytic seizures. For in this vertigo from intoxication so much sensorial power in general is expended on the increased actions of the stomach, and its nearest connections, as the capillaries of the skin; that there is a deficiency for the purposes of the other irritative associations of motions usually connected with it. This auditory vertigo attends both the rotatory and the visual vertigo above-mentioned; in the former it is introduced by reverse sympathy, that is, by the diminution of sensorial power; too great a quantity of it being expended on the increased irritative motions of vision; in the latter it is produced either by the same causes which produce the visual vertigo, or by direct sympathy with it. See Sect. XX. 7.

M. M. Stimulate the internal ear by ether, or with essential oil diluted with expressed oil, or with a solution of opium in wine, or in water.

Or with salt and water. Apply a clipping glass over the ear. See I. 2. 3. 6. Galvanic shocks through the temples. See IV. 2. 1. 11.

16. *Tactus, gustus, olfactus vertiginosi.* Vertiginous touch, taste, and smell. In the vertigo of intoxication, when the patient lies down in bed, it sometimes happens even in the dark, that the bed seems to librate under him, and he is afraid of falling out of it. The same occurs to people, who are sea-sick, even when they lie down in the dark. In these the irritative motions of the nerves of touch, or irritative tangible ideas, are performed with less energy, in one case by reverse sympathy with the stomach, in the other by reverse sympathy with the nerves of vision, and in consequence become attended with sensation, and produce the fear of falling by other associations. *And I consider that the same may be true of taste.* A vertigo of the sense of touch may be produced, if any one turns round for a time with his eyes shut, and suddenly stops without opening them; for he will for a time seem to be still going forwards; which is difficult to explain. See Sect. XXI. 6.

In the beginning of some fevers, along with incessant vomiting, the patients complain of disagreeable tastes in their mouth, and disagreeable odours, which are to be ascribed to the general debility

debility of the great trains and tribes of associated irritative motions, and to be explained from their direct sympathy with the decreased action of a sick stomach; or from the less secretion of sensorial power in the brain. These organs of sense are constantly stimulated into action by the saliva or by the air; hence, like the sense of hunger, when they are torpid from want of stimulus, or from want of sensorial power, pain or disagreeable sensation ensues, as of hunger, or faintness, or sickness in one case; and the ideas of bad tastes or odours in the other. This accords with the laws of causation, Sect. IV. 5.

17. *Pulsus mollis in vomitione.* The softness of the pulse in the act of vomiting is caused by direct association between the heart and the stomach; as explained in Sect. XXV. 17. A great slowness of the pulsation of the heart sometimes attends sickness, and even with intermissions of it, as in the exhibition of too great a dose of digitalis.

18. *Pulsus intermittens a ventriculo.* When the pulse first begins to intermit, it is common for the patient to bring up a little air from his stomach; which if he accomplishes before the intermission occurs, always prevents it; whence that this debility of the heart is owing to the direct

rect association of its motions with those of the stomach is well evinced. See Sect. XXV. 17.

I this morning saw Mr. —, who has long had at times an unequal pulse, with indigestion and flatulency, and occasional asthma; he was seized two days ago with diarrhoea, and this morning with sickness; and his pulse was every way unequal. After an emetic his pulse still continued very intermittent and unequal. He then took some breakfast of toast and butter, and tea, and to my great surprise his pulse became immediately perfectly regular, about 100 in a minute, and not weak, by this stimulus on his stomach.

A person, who for many years had had a frequent intermission of his pulse, and occasional palpitation of his heart, was relieved from them both for a time by taking about four drops of a saturated solution of arsenic three or four times a day for three or four days. As this intermission of the pulse is occasioned by the direct association of the motions of the heart with those of the stomach, the indication of cure must be to strengthen the action of the stomach by the bark. Spice. Moderate quantities of wine. A blister. Half a grain of opium twice a day. Solution of arsenic?

19. *Febris irritativa.* Irritative fever described in Class I. 2. 1. 1. belongs to this place,
as

as it consists of disordered trains and tribes of associated irritative motions, with lessened actions, of the associated organs. In this fever the pulsations of the heart and arteries are weakened or lessened, not only in the cold paroxysm, as in the irritative fever, but also in the hot paroxysm. The capillary arteries or glands have their actions nevertheless increased after the first cold fit, as appears by the greater production of heat, and the glow of arterial blood in the cutaneous vessels; and lastly, the action of the stomach is much impaired or destroyed, as appears by the total want of appetite to solid food. Whence it would seem, that the torpid motions of the stomach, whatever may occasion them, are a very frequent cause of continued fever with weak pulse; and that these torpid motions of the stomach do not sufficiently excite the sensorial power of association, which contributes in health to actuate the heart and arteries along with the irritation produced by the stimulus of the blood; and hence the actions of these organs are weaker. And lastly, that the accumulation of the sensorial power of association, which ought to be expended on the motions of the heart and arteries, becomes now exerted on the cutaneous and pulmonary capillaries. See Supplement I. 8. and Sect. XXXV. 1. 1. and XXXIII. 2. 10.

I have dwelt longer on the vertiginous diseases
in

in this genus, both because of their great intricacy, and because they seem to open a road to the knowledge of fever, which consists of associated trains and tribes of irritative or sensitive motions, which are sometimes mixed with the vertiginous ones, and sometimes separate from them.

ORDO

ORDO II.

Decreased Associate Motions.

GENUS II.

Catenated with Sensitive Motions.

IN this genus the sensorial power of association is exerted with less energy, and thence the actions produced by it are less than natural; and pain is produced in consequence, according to the fifth law of animal causation, Sect. IV. This pain is generally attended with coldness of the affected part, and is seldom succeeded by inflammation of it. This decreased action of the secondary link of the associated motions, belonging to this genus, is owing to the previous exhaustion of sensorial power either in the increased actions of the primary link of the associated motions, or by the pain which attends them; both which are frequently the consequence of the stimulus of something external to the affected fibres.

As pain is produced either by excess or defect of the natural exertions of the fibres, it is not, considered separately, a criterion of the presence of either. In the associations belonging to this genus the sensation of pain or pleasure produces or attends the primary link of the associated motions, and very often gives name to the disease.

When great pain exists without causing any fibrous

fibrous motions, I conjecture that it contributes to exhaust or expend the general quantity of sensorial power; because people are fatigued by enduring pain, till at length they sleep. Which is contrary to what I had perhaps erroneously supposed in Sect. XXXV. 2. 3. If it causes fibrous motions, it then takes the name of sensation, according to the definition of sensation in Sect. II. 2. 9.; and increased fibrous action or inflammation is the consequence. This circumstance of the general exhaustion of sensorial power by the existence of pain will assist in explaining many of the diseases of this genus.

Many of the canals of the body, as the urethra, the bile-duct, the throat, have the motions of their two extremities associated by having been accustomed to feel pleasurable or painful sensations at the same time or in succession. This is termed sensitive association, though those painful or pleasurable sensations do not cause the motions, but only attend them; and are thus perhaps, strictly speaking, only catenated with them.

S P E C I E S.

1. *Torpor gene a dolore dentis.* In tooth-ach there is generally a coldness of the cheek, which is sensible to the hand, and is attended in some degree with the pain of cold. The cheek and tooth have frequently been engaged in pleasurable action at the same time during the masticating of our

our food; whence they have acquired sensitive associations. The torpor of the cheek may have for its cause the too great expenditure of sensorial power by the painful sensation of the membranes of the diseased tooth; whence the membranes of the cheek associated with those of the alveolar process are deprived of their natural share of it, and become torpid; thus they produce less secretions, and less heat, and the pain of cold is the consequence. This torpor of the vessels of the cheek cannot be produced by the activity of the sensorial power of sensation; for then they would act more violently than natural, or become inflamed. And though the pain by exhausting so much sensorial power may be a remote cause, it is the defect of the power of association, which is the immediate cause of the torpor of the cheek.

After some hours this pain occasioned by the torpor of the vessels of the cheek either gradually ceases along with the pain of the diseased tooth; or, by the accumulation of sensorial power during their state of torpor, the capillaries of the cheek act with greater violence, and produce more secretions, and heat, and consequent tumour, and inflammation. In this state the pain of the diseased tooth ceases; as the sensorial power of sensation is now expended on the inflamed vessels of the cheek. It is probable that most other internal membranous inflammations begin in a similar manner; whence there may seem

seem to be a double kind of sensitive association ; first, with decreased action of the associated organ, and then with increased action of it ; but the latter is in this case simply the consequence of the former ; that is, the tumour or inflammation of the cheek is in consequence of its previous quiescence or torpor.

2. *Stranguria a dolore vesice.* The strangury, which has its origin from pain at the neck of the bladder, consists of a pain in the external extremity of the urethra or of the glans penis of men, and probably in the external termination of the urethra or of the clitoris of women ; and is owing to the sympathy of these with some distant parts, generally with the other end of the urethra ; an endeavour and difficulty of making water attends this pain.

Its remote cause is from the internal or external use of cantharides, which stimulate the neck of the bladder ; or from a stone, which whenever it is pushed into the neck of the bladder, gives this pain of strangury, but not at other times ; and hence it is felt most severely in this case after having made water.

The sensations or sensitive motions of the glans penis, and of the sphincter of the bladder, have been accustomed to exist together during the discharge of the urine ; and hence the two ends of the urethra sympathize by association. When

there is a stone at the neck of the bladder, which is not so large or rough as to inflame the part, the sphincter of the bladder becomes stimulated into pain; but as the glans penis is for the purposes of copulation more sensitive than the sphincter of the bladder, as soon as it becomes affected with pain by the association above mentioned, the sensation at the neck of the bladder ceases; and then the pain of the glans penis would seem to be associated with the irritative motions only of the sphincter of the bladder, and not with the sensitive ones of it. But a circumstance similar to this occurs in epileptic fits, which at first are induced by disagreeable sensation, and afterwards seem to occur without previous pain, from the suddenness with which they follow and relieve the pain, which occasioned them. From this analogy I imagine the pain of the glans penis is associated with the pain of the sphincter of the bladder; but that *as soon as the greater pain in a more sensible part is produced; the less pain, which occasioned it, ceases*; and that this is one of the laws of sensitive association. See Sect. XXXV. 2. 1.

A young man had by an accident swallowed a large spoonful or more of tincture of cantharides; as soon as he began to feel the pain of strangury, he was advised to drink large quantities of warmish water: to which, as soon as it could be gotten, some gum arabic was added. In an hour or two he drank by intervals of a few minutes about two gallons of water, and discharged

his urine every four or five minutes. A little blood was voided towards the end, but he suffered no ill consequence.

M. M. Warm water internally. Clysters of warm water. Fomentation. Opium. Solution of fixed alkali supersaturated with carbonic acid. A bougie may be used to push back a stone into the bladder. See Class I. 1. 3. 10.

3. *Stranguria convulsiva*. The convulsive strangury, like that before described, is probably occasioned by the torpor or defective action of the painful part in consequence of the too great expenditure of sensorial power on the primary link of the associated motions, as no heat or inflammation attends this violent pain. This kind of strangury recurs by stated periods, and sometimes arises to so great a degree, that convulsion or temporary madness terminates each period of it. It affects women oftener than men, is attended with cold extremities without fever, and is distinguished from the stone of the bladder by the regularity of its periods, and by the pain being not increased after making water.

On introducing the catheter sometimes part of the urine will come away and not the whole, which is difficult to explain; but may arise from the weakness of the muscular fibres of the bladder, which are not liable suddenly to contract themselves so far as to exclude the whole of

the urine. In some old people, who have experienced a long retention of urine, the bladder never regains the power of completely emptying itself; and many who are beginning to be weak from age can make water a second time, a few minutes after they supposed they had emptied the bladder.

I have believed this pain to originate from sympathy with some distant part, as from ascarides in the rectum, or from piles in women; or from caruncles in the urethra about the caput gallinaginis in men; and that the pain has been in the glans or clitoris by reverse sympathy of these more sensible parts with those above mentioned.

M. M. Venesection. Opium in large quantities. Warm bath. Balsams. Bark. Tincture of cantharides. Bougie, and the treatment for haemorrhoids. Leeches applied to the sphincter ani. Aerated alkaline water. Soap and sal soda. Opium in clysters given an hour before the expected return. Smoke of tobacco in clysters. Arsenic.

4. *Dolor termini intestinalis ductus choledochi.*
Pain at the intestinal end of the gall-duct. When a gall-stone is protruded from the gall-bladder a little way into the end of the gall-duct, the pain is felt at the other end of the gall-duct, which terminates in the duodenum. For the actions of the two terminations of this canal are as-

sociated together from the same streams of bile passing through them in succession, exactly as the two terminations of the urethra have their actions associated, as described in Species 2 and 3 of this genus. But as the intestinal termination of the bile-duct is made more sensible for the purpose of bringing down more bile, when it is stimulated by new supplies of food from the stomach, it falls into violent pain from association ; and then the pain on the region of the gall-bladder ceases, exactly as above explained in the account of the pain of the glans penis from a stone in the sphincter of the bladder.

The common bile-duct opens into the intestine exactly at what is called the pit of the stomach ; and hence it has sometimes happened, that this pain from association with the sensation of a gall-stone at the other end of the bile-duct has been mistaken for a pain of the stomach.

For the method of cure see Class I. 1. 3. 8. to which should be added the use of strong electric shocks passed through the bile-duct from the pit of the stomach to the back, and from one side to the other. A case of the good effect of electricity in the jaundice is related in Sect. XXX. 2. And another case, where it promoted the passage of a painful gall-stone, is described by Dr. Hall, experienced on himself. *Trans. of the College at Philadelphia, Vol. I. p. 192.*

Half a pint of warm water two or three times
1 a day

a day is much recommended to dilute the insipid bile.

5. *Dolor pharyngis ab acido gastrico.* The two ends of the throat sympathize by sensitive association in the same manner as the other canals above mentioned, namely, the urethra and the bile-duct; hence when too great acidity of undigested aliment, or the carbonic acid air, which escapes in fermentation, stimulates the cardia ventriculi, or lower end of the gula, into pain, the pharynx, or upper end of it, is affected with greater pain, or a disagreeable sensation of heat.

6. *Pruritus narium a vermis.* The itching of the nose from worms in the intestines is another, curious instance of the sensitive associations of the motions of membranes; especially of those which constitute the canals of the body. Previous to the deglutition of agreeable food, as milk in our earliest infancy, an agreeable odour affects the membrane, which lines the nostrils; and hence an association seems to take place between the agreeable sensations produced by food in the stomach and bowels, and the agreeable sensations of the nostrils. The existence of acarides in the rectum I believe produces this itching of the nostrils more than the worms in other parts of the intestines; as we have already seen, that the terminations of canals sympathize more

than their other parts, as in the urethra and gall-ducts. See Class I. 1. 5. 9. IV. 1. 2. 9. 11. 12.

7. *Cephalaea sympathetica*. Sympathetic head-ach. In cold fits of the ague, the head-ach arises from consent with some torpid viscera, like the pain of the loins. After drunkenness the head-ach is very common, owing to direct sympathy of the membranes of the head with those of the stomach; which is become torpid after the too violent stimulus of the preceding intoxication; and is hence removable by spirit of wine, or opium, exhibited in smaller quantities. In some constitutions these head-achs are induced, when the feet are exposed to much external cold; in this case the feet should be covered with oiled silk, which prevents the evaporation of the perspirable matter, and thence diminishes one cause of external cold.

M. M. Valerian in powder two drams three, or four times a day is recommended. The bark, Chalybeates. A grain of opium twice a day for a long time. From five to ten drops of the saturated solution of arsenic two or three times a day. See Class I. 2. 4. 11. A lady once assured me, that when her head-ach was coming on, she drank three pints (pounds) of hot water, as hastily as she could; which prevented the progress of the disease. A solution of arsenic is recommended.

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ed by Dr. Fowler of York. Very strong erthines are laid sometimes to cure head-achs taken at the times the pain recurs, till a few drops of blood issue from the nostrils. As one grain of turpeth mineral (vitriolic calx of mercury) mixed with ten grains of fine sugar. Euphorbium or cayenne pepper mixed with sugar, and used with caution as an erthine. See the M. M. of the next Species.

8. *Hemicrania sympathetica*. Sympathetic pain on one side of the head. This disease is attended with cold skin, and hence whatever may be the remote cause, the immediate one seems to be want of stimulus, either of heat or distention, or of some other unknown stimulus in the painful part; or in those, with which it is associated. The membranes in their natural state are only irritable by distention; in their diseased state, they are sensible like muscular fibres. Hence a diseased tooth may render the neighbouring membranes sensible, and is frequently the cause of this disease.

Sometimes the stomach is torpid along with the pained membrane of the head; and then sickness and inappetency attend either as causes or consequences. The natural cure of hemicrania is the accumulation of sensorial power during the rest or sickness of the patient. Man is frequently liable to hemicrania with sickness,

which is probably owing to a diseased tooth ; the paroxysm occurs irregularly, but always after some previous fatigue, or other cause of debility. She lies in bed, sick, and without taking any solid food, and very little of fluids, and those of the aqueous kind, and, after about 48 or 50 hours, rises free from complaint. Similar to this is the recovery from cold paroxysms of fever, from the torpor occasioned by fear, and from syncope ; which are all owing to the accumulation of sensorial power during the inactivity of the system. Hence it appears, that, though when the sensorial power of volition is much exhausted by fatigue, it can be restored by eight or ten hours of sleep ; yet, when the sensorial power of irritation is exhausted by fatigue, that it requires two whole solar or lunar days of rest, before it can be restored.

The late Dr. Monro asserted in his lectures, that he cured the hemicrania, or megrim, by a strong vomit, and a brisk purge immediately after it. This method succeeds best if opium and the bark are given in due quantity after the operation of the cathartic ; and with still more certainty, if bleeding in small quantity is premised, where the pulse will admit of it. See Sect. XXXV. 2. 1.

Mr. Kellie asserts, that some kinds of headaches, especially those which arise from defect of stimulation, may be cured by compressing the two subclavian arteries, as they pass over the first rib ; which he thinks would produce a pressure

sure on the brain similar to that, which may be produced by the centrifugal force, if a person was to lie across a mill-stone as it revolves. See Suppl. L. 15. 7. Would such a circulating bed remove any kind of head-ach?

The pain generally affects one eye, and spreads a little way on that side of the nose, and may sometimes be relieved by pressing or cutting the nerve, where it passes into the bone of the orbit above the eye. When it affects a small defined part on the parietal bone on one side, it is generally termed *Clavus hystericus*, and is always I believe owing to a diseased dens molaris. The tendons of the muscles, which serve the office of mastication, have been extended into pain at the same time that the membranous coverings of the roots of the teeth have been compressed into pain, during the biting or mastication of hard bodies. Hence when the membranes, which cover the roots of the teeth, become affected with pain by a beginning decay, or perhaps by the torpor or coldness of the dying part of the tooth, the tendons and membranous fascia of the muscles about the same side of the head become affected with violent pain by their sensitive associations: and as soon as this associated pain takes place, the pain of the tooth entirely ceases, as explained in the second species of this genus.

A remarkable circumstance attends this kind of hemicrania, viz. that it recurs by periods like those of intermittent fevers, as explained in the Section

Section on Catenation of Motions; these periods sometimes correspond with alternate lunar or solar days like tertian agues, and that even when a decaying tooth is evidently the cause; which has been evinced by the cure of the disease by extracting the tooth. At other times they observe the monthly lunations, and seem to be induced by the debility, which attends menstruation.

The dens sapientiae, or last tooth of the upper jaw, frequently decays first, and gives hemicrania over the eye on the same side. The first or second grinder in the under-jaw is liable to give violent pain about the middle of the parietal bone, or side of the head, on the same side, which is generally called the Clavis Hystericus; of which an instructive case is related in Sect. XXXV. 2. 1.

Since the above was first published I have seen two cases, which were very similar, and seem much to confirm the above theory of sympathetic hemicrania being perhaps always owing to the sympathy of the membranes about the cranium with those about diseased teeth. Lord M. and Mr. B. of Edinburgh, both of them about the middle of life were afflicted with violent hemicrania for about two years; in the beginning of which time they both assured me, that their teeth were perfectly sound, but on inspecting their mouths I found all the molares were now so decayed as to have lost their crowns. After having suffered pain for sixteen or eighteen months

months almost incessantly in different parts of their heads, they had each of them a hemiplegia, from which they gradually recovered, as much as paralytic affections generally do recover. All the stumps of their teeth, which were useless, were directed to be extracted; as the swallowing so much putrid matter from decaying bodies seemed to injure their digestion. They were desired not to drink wine or ale without its being diluted with twice or thrice its quantity of water, to prevent any access of torpor from too great previous stimulus, and to take six grains of rhubarb with three of soap made into pills, every night, with some bitter and very slight chalybeate medicines. If the teeth which became torpid in succession, could have been discovered, and extracted, before they decayed, and could have been replaced, might not this continuance of pain, and consequent paralysis, have been prevented? or might not a moderate salivation have effected this purpose?

M. M. Detect and extract the diseased tooth. Cut the affected nerve, or stimulate the diseased membrane by acupuncture. Venesection to six ounces by the lancet or by leeches. A strong emetic and a subsequent cathartic; and then an opiate and the bark. Pass small electric shocks through the pained membrane, and through the teeth on the same side. Apply vitriolic ether externally, and a grain of opium with camphor internally, to the cheek on the affected side, where a diseased

a diseased tooth may be suspected. Foment the head with warm vinegar. Drink two large spoonfuls of vinegar. Stimulate the gums of the suspected teeth by oil of cloves, by opium. See Class I. 1. 4. 4. Snuff volatile spirit of vinegar up the nostrils. Lastly, in permanent head-achs, as in permanent vertigo, I have seen good effect in two cases by the use of mercurial ointment rubbed on the shaved head or about the throat, till a mild salivation commences, which by inflaming the membranes of the teeth may prevent their irritative sympathy with those of the cranium. Thus by inflaming the tendon, which is the cause of locked jaw, and probably by inflaming the wound, which is the cause of hydrophobia, those diseases may be cured, by disuniting the irritative sympathy between those parts, which may not possess any sensitive sympathy. This idea is well worth our attention.

Otalgia. Ear-ach is another disease occasioned by the sympathy of the membranes of the ear with those which invest or surround a decaying tooth, as I have had frequent reason to believe; and is frequently relieved by filling the ear with tincture of opium. See Class I. 2. 4.

9. *Dolor humeri in hepatidide.* In the efforts of excluding the fæces and urine the muscles of the shoulders are exerted to compress the air in the lungs, that the diaphragm may be pressed down.

Hence

Hence the distention of the tendons or fibres of these muscles is associated with the distention of the tendons or fibres of the diaphragm; and when the latter are pained by the enlargement or heat of the inflamed liver, the former sympathize with them. Sometimes but one shoulder is affected, sometimes both; it is probable that many other pains, which are termed rheumatic, have a similar origin, viz. from sensitive associations.

As no inflammation is produced in consequence of this pain of the shoulder, it seems to be owing to inaction of the membranous part from defect of the sensorial power of association, of which the primary link is the inflamed membrane of the liver; which now expends so much of the sensorial power in general by its increased action, that the membranes about the shoulder, which are links of association with it, become deprived of their usual share, and consequently fall into torpor.

10. *Torpor pedum in eruptione variolarum.* At the commencement of the eruption of the small-pox, when the face and breast of children are very hot, their extremities are frequently cold. This I ascribe to sensitive association between the different parts of the skin; whence when a part acts too violently, the other part is liable to act too weakly; and the skin of the face being affected

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ed first in the eruption of the small-pox, the skin of the feet becomes cold in consequence by reverse sympathy.

M. M. Cover the feet with flannel, and expose the face and bosom to cool air, which in a very short time both warms the feet and cools the face; and hence what is erroneously called a rash; but which is probably a too hasty eruption of the small-pox, disappears; and afterwards fewer and more distinct eruptions of the small-pox supervene.

11. *Testium dolor nephriticus.* The pain and retraction of the testicle on the same side, when there is a stone in the ureter, is to be ascribed to sensitive association; whether the connecting cause be a branch of the same nerve, or from membranes, which have been frequently affected at the same time.

12. *Dolor digitii minimi sympatheticus.* When any one accidentally strikes his elbow against any hard body, a tingling pain runs down to the little finger end. This is owing to sensitive association of motions by means of the same branch of a nerve, as in hemicrania from a decaying tooth the pain is owing to the sensitive association of tendons or membranes.

13. *Dolor brachii in hydrope pectoris.* The pain in

in the left arm which attends some dropsies of the chest, is explained in Sect. XXIX. 5. 2. 10. which resembles the pain of the little finger from a percussion of the nerve at the elbow in the preceding article. A numbness of this kind is produced over the whole leg, when the crural nerve is much compressed by sitting for a time with one leg crossed over the other.

Mr. ——, about sixty, had for two years been affected with difficulty of respiration on any exertion, with pain about the sternum, and of his left arm; which last was more considerable than is usual in dropsy of the chest; some months ago the pain of his arm, after walking a mile or two, became excessive, with coldness and numbness; and on the next day the back of the hand, and a part of the arm swelled, and became inflamed, which relieved the pain; and was taken for the gout, and continued several days. He after some months became dropsical both in respect to his chest and limbs, and was six or seven times perfectly relieved by one dram of saturated tincture of digitalis, taken two or three times a day for a few days in a glass of peppermint water. He afterwards breathed oxygen gas undiluted, in the quantity of six or eight gallons a day for three or four weeks without any effect, and sunk at length from general debility.

In this instructive case I imagine the pressure or stimulus of one part of the nerve within the

chest caused the other part, which serves the arm, to become torpid, and consequently cold by sympathy; and that the inflammation was the consequence of the previous torpor and coldness of the arm, in the same manner as the swelling and inflammation of the cheek in tooth-ach, in the first species of this genus; and that many rheumatic inflammations are thus produced by sympathy with some distant part.

14. *Diarrhœa a dentitione.* The diarrhœa, which frequently attends dentition, is the consequence of indigestion; the aliment acquires chemical changes, and by its acidity acts as a cathartic; and changes the yellow bile into green, which is evacuated along with indigested parts of the coagulum of milk. The indigestion is owing to the torpor of the stomach and intestines caused by their association with the membranes of the gums, which are now stimulated into great exertion with pain; both which contribute to expend the general quantity of sensorial power, which belongs to this membranous association; and thus the stomach and intestines act with less than their natural energy. This is generally esteemed a favourable symptom in difficult dentition, as the pain of the alveolar membranes exhausts the sensorial power without producing convulsions for its relief. See Class I. 1. 4. 5. And the diarrhœa ceases, as the tooth advances.

ORDO

ORDO II.

Decreased Associate Motions.

GENUS III.

Catenated with Voluntary Motions.

SPECIES.

1. *Titubatio linguae.* Impediment of speech is owing to the associations of the motions of the organs of speech being interrupted or dissevered by ill-employed sensation or sensitive motions, as by awe, bashfulness, ambition of shining, or fear of not succeeding, and the person uses voluntary efforts in vain to regain the broken associations, as explained in Sect. XVII. 1. 10. and XVII. 2. 10.

The broken association is generally between the first consonant and the succeeding vowel; as in endeavouring to pronounce the word *parable*, the *p* is voluntarily repeated again and again, but the remainder of the word does not follow, because the association between it and the next vowel is dissevered.

M. M. The art of curing this defect is to cause the stammerer to repeat the word, which he finds difficult to speak, eight or ten times without the initial letter, in a strong voice, or with an aspirate before it, as *arable*, or *harable*; and at length to speak it very softly with the initial letter *p*, *para-*

VOL. IV.

U

ble.

ble. This should be practised for weeks or months upon every word, which the stammerer hesitates in pronouncing. To this should be added much commerce with mankind, in order to acquire a carelessness about the opinions of others.

2. *Chorea Sti. Viti.* In the St. Vitus's dance the patient can at any time lie still in bed, which shews the motions not to be convulsive; and he can at different times voluntarily exert every muscle of his body; which evinces, that they are not paralytic. In this disease the principal muscle in any designed motion obeys the will; but those muscles, whose motions were associated with the principal one, do not act; as their association is dissevered, and thus the arm or leg is drawn outward, or inward, or backward, instead of upward or forward, with various gestulations exactly resembling the impediment of speech.

This disease is frequently left after the itch has been too hastily cured. See *convulsio dolorifica*, Class III. 1. 1. 6. A girl about eighteen, after wearing a mercurial girdle to cure the itch, acquired the Chorca St. Viti in so universal a manner, that her speech became affected as well as her limbs; and there was evidently a disunion of the common trains of ideas; as the itch was still among the younger children of the family, she was advised to take her sister as a bedfellow, and thus

thus received the itch again; and the dance of St. Vitus gradually ceased. See Class II. 1. 5. 6.

M. M. Give the patient the itch again. Calomel a grain every night, or sublimate a quarter of a grain twice a day for a fortnight. Steel. Bark. Warm bath. Cold bath. Opium, Venesection once at the beginning of the disease, Electricity. Perpetual slow and repeated efforts to move each limb in the designed direction, as in the titubatio linguae above described.

3. *Risus.* Laughter is a perpetual interruption of voluntary exertion by the interposition of pleasurable sensation; which not being checked by any important consequences rises into pain, and requires to be relieved or moderated by the frequent repetition of voluntary exertion. See Sect. XXXIV. 1. 4. and Class III. 1. 1. 4. and IV. 1. 3. 3.

4. *Tremor ex irâ.* The trembling of the limbs from anger. The interruption of the voluntary associations of motions by anger, originates from too great a part of the sensorial power being exerted on the organs of sense; whence the muscles, which ought to support the body upright, are deprived of their due quantity, and tremble from debility. See Class III. 2. 1. 1.

5. *Rubor ex irâ.* Redness from anger. Anger
U 2 is

is an excess of aversion, that is of voluntariness not yet employed. It is excited by the pain of offended pride; when it is employed it becomes outrage, cruelty, insanity. The cutaneous capillaries, especially those of the face, are more mobile, that is, more easily excited into increased action, or more easily become torpid, from less variation of sensorial power, than any other parts of the system; which is owing to their being perpetually subject to the vicissitudes of heat and cold, and of extension and corrugation. Hence, when an excess of voluntariness exists without being immediately expended in the actions of the large muscles, the capillary arteries and glands acquire more energetic action, and a flushed skin is produced, with increased secretion of perspirable matter, and consequent heat, owing to the pause or interruption of voluntary action; and thus the actions of these cutaneous vessels become associated between the irascent ideas and irascent muscular actions, which are thus for a time interrupted.

6. *Rubor criminati.* The blushing of accused people, whether guilty or not, appears to be owing to circumstances similar to that of anger; for in these situations there is always a sudden voluntariness, or wish, of clearing their characters arises in the mind of the accused person; which, before an opportunity is given for it to be expended on the large muscles, influences the capillary arteries

teries and glands, as in the preceding article. Whence the increased actions of the capillaries, and the consequent redness and heat, become exerted between the voluntary ideas of self-defence, and the muscular actions necessary for that purpose; which last are thus for a time interrupted or delayed.

Even in the blush of modesty or bashfulness there is a self-condemnation for some supposed defect or indecorum, and a sudden voluntariness, or wish, of self-defence; which not being expended in actions of the larger muscles excites the capillaries into action; which in these subjects are more mobile than in others.

The blush of young girls on coming into an assembly room, where they expect their dress, and steps, and manner, to be examined, as in dancing a minuet, may have another origin; and may be considered as a hot fit of returning confidence, after a previous cold fit of fear.

7. *Tarditas paralytica.* By a stroke of the palsy or apoplexy it frequently happens, that those ideas which were associated in trains, whose first link was a voluntary idea, have their connection disengaged; and the patient is under the necessity, by repeated efforts, slowly to renew their associations. In this situation those words, which have the fewest other words associated with them, as the proper names of persons or

places, are the most difficult to recollect. And in those efforts of recollection the word opposite to the word required is often produced, as hot for cold, winter for summer, which is owing to our associating our ideas of things by their opposites as well as by their similitudes, and in some instances perhaps more frequently, or more forcibly. Other paralytic patients are liable to give wrong names to external objects, as using the word pigs for sheep, or cows for horses; in this case the association between the idea of the animal and the name of it is disengaged; but the idea of the class or genus of the thing remains; and he takes a name from the first species which presents itself, and sometimes can correct himself, till he finds the true one.

8. *Tarditas senilis.* Slowness of age. The difficulty of associating ideas increases with our age; as may be observed from old people forgetting the business of the last hour, unless they impress it strongly, or by frequent repetition, though they can well recollect the transactions of their youth. I saw an elderly man, who could reason with great clearness and precision, and in accurate language on subjects, which he had been accustomed to think upon; and yet did not know that he had rung the bell by his fire-side in one minute afterwards; nor could then recollect the object he had wanted, when his servant came.

Similar

Similar to this is the difficulty which old people experience in learning new bodily movements; that is, in associating new muscular actions, as in learning a new trade or manufacture. The trains of movements, which obey volition, are the last which we acquire; and the first, which are dissociated.

The symbols most in use, with which we have associated ideas, are those of visible and of audible language. It is curious to observe in the instruction of young people, that some remember written language the best, and others vocal language. The same thing sometimes occurs in aged people, that is, that some lose the ideas associated with sounds soonest, and others those associated with letters. See *Recollectio*nis *jactura*, Class III. 2. 2. 1. and *Tarditas paralytica* above.

The following curious account of this defect of association of ideas with audible but not with visible symbols was sent me by Dr. Darwin of Shrewsbury.

“ The case of an old man lately occurred to me, who was superannuated; his hearing and vision were perfect, but he could only call up a train of ideas from the latter. When he was told it was nine o'clock, and time for him to eat his breakfast, he repeated the words distinctly but without understanding them. His servant put a watch into his hand. “ Why, William, have not I my breakfast, for it is just nine o'clock ?”

he would say with expression, that shewed he felt what he said.

"On almost every occasion his servants conversed with him by visible objects, although his hearing was perfect; and when this kind of communication was used, he did not appear impaired in his intellects. This state came on from a stroke of the palsy; and till he and his attendants used this kind of language he was quite childish."

ORDO

ORDO II.

Decreased Associate Motions.

GENUS IV.

Catered with External Influences.

As the diseases, which obey solar or lunar periods, commence with torpor or inactivity, such as the cold paroxysms of fevers, the torpor and consequent pain of hemicrania, and the pains which precede the fits of epilepsy and convulsion, it would seem, that these diseases are more generally owing to the diminution than to the excess of solar or lunar gravitation ; as the diseases, which originate from the influence of the matter of heat, are much more generally in this country produced by the defect than by the excess of that fluid.

The periodic returns of so many diseases coincide with the diurnal, monthly, and annual rounds of time ; that any one, who would deny the influence of the sun and moon on the periods of quotidian, tertian, and quartan fevers, must deny their effect on the tides, and on the seasons. It has generally been believed, that solar and lunar effect was exerted on the blood ; which was thus rendered more or less stimulant to the system, as described in Sect. XXXII. 6. But as the fluid matter of gravitation permeates and covers all things, like the fluid matter of heat ; I am induced

duced to believe, that gravitation acts in its medium state rather as a *causa fine quâ non* of animal motion, like heat; which may disorder the system chemically or mechanically, when it is diminished; but may nevertheless stimulate it, when increased, into animal exertion.

Without heat and motion, which some philosophers still believe to be the same thing, as they so perpetually appear together, the particles of matter would attract and move towards each other, and the whole universe freeze or coalesce into one solid mass. These therefore counteract the gravitation of bodies to one centre; and not only prevent the planets from falling into the sun, but become either the efficient causes of vegetable and animal life, or the causes without which life cannot exist; as by their means the component particles of matter are enabled to slide over each other with all the various degrees of fluidity and repulsion.

As the attraction of the moon countervails or diminishes the terrene gravitation of bodies on the surface of the earth; a tide rises on that side of the earth, which is turned towards the moon; and follows it, as the earth revolves. Another tide is raised at the same time on the opposite side of the revolving earth, which is owing to the greater centrifugal motion of that side of the earth, which counteracts the gravitation of bodies near its surface. For the earth and moon may be considered as two cannon balls of

different

different sizes held together by a chain, and revolving once a month round a common centre of gravity between them, near the earth's surface; at the same time that they perform their annual orbits round the sun. Whence the centrifugal force of that side of the earth, which is farthest from this centre of motion, round which the earth and moon monthly revolve, is considerably greater, than the centrifugal force of that side of the earth which is nearest it; to which should be added, that this centrifugal force not only contributes to diminish the terrene gravitation of bodies on the earth's surface on that side furthest from the centre of motion, but also to increase it on that side, which is nearest it.

Another circumstance, which tends to raise the tide on the part of the earth's surface, which is most distant from the moon, is, that the attraction of the moon is less on that part of the ocean, than it is on the other parts of the earth. Thus the moon may be supposed to attract the water on the side of the earth nearest it with a power equal to three; and to attract the central parts of the earth with a power equal to two; and the water on the part of the earth most distant from the moon with a power only equal to one. Hence on the side of the earth most distant from the moon, the moon's attraction is less, and the centrifugal force round their common centre of motion is greater; both which contribute to raise the tides.

tides on that side of the earth. On the side of the earth nearest the moon, the moon's attraction is so much greater as to raise the tides; though the centrifugal force of the surface of the earth round their common centre of motion in some degree opposes this effect.

On these accounts, when the moon is in the zenith or nadir, the gravitation of bodies on the earth's surface will be greatest at the two opposite quadratures; that is, the greatest gravitation of bodies on the earth's surface towards her centre during the lunar day is about six hours and a half after the southing, or after the northing of the moon.

Circumstances similar to these, but in a less degree, must occur in respect to the solar influence on terrestrial bodies; that is, there must be a diminution of the gravity of bodies near the earth's surface at noon, when the sun is over them; and also at midnight from the greater centrifugal force of that side of the earth, which is most distant from the centre, round which the earth moves in her annual orbit, than on the side nearest that centre. Whence it likewise follows, that the gravitation of bodies towards the earth is greatest about six hours after noon, and after midnight.

Now when the sun and moon have their united gravitation on the same side of the earth, as at the new moon; or when the solar attraction coincides with the greater centrifugal motion of that side

side of the earth, which is furthest distant from the moon, as at the full moon; and when this happens about noon or midnight, the gravitation of terrene bodies towards the earth will be greater about six hours after noon, and after midnight, than at any other part of the lunar period; because the attraction of both these luniharies is then exerted on those sides of the earth over which they hang, which at other times of the month are more or less exerted on other parts of it.

Lastly, as heat and motion counteract the gravitation of the particles of bodies to each other, and hence become either the efficient causes of vegetable and animal life, or the causes without which life cannot exist, it seems to follow, that when our gravitation towards the earth's centre is greatest, the powers of life should be the least; and hence that those diseases, which begin with torpor, should occur about six hours after the solar or lunar noon, or about six hours after the solar or lunar midnight; and this most frequently about six hours after or before the new or full moon; and especially when these happen at noon or at midnight; or lastly, according to the combination of these powers in diminishing or increasing the earth's attraction to bodies on its surface.

The returns or exacerbations of many fevers, both irritative and inflammatory, about six in the evening, and of the periodic cough described in

Sect. XXXVI. 3. 9. countenance this theory. Tables might be made out to shew the combined powers of the sun and moon in diminishing the gravitation of bodies on the earth's surface, at every part of their diurnal, monthly, and annual periods; and which might facilitate the elucidation of this subject. But I am well aware of the difficulty of its application to diseases, and hope these conjectures may induce others to publish more numerous observations, and more conclusive reasonings.

SPECIES.

1. *Somni periodus.* The periods of sleeping and of waking are shortened or prolonged by so many other circumstances in animal life, besides the minute difference between diurnal and nocturnal solar gravitation, that it can scarcely be ascribed to this influence. At the same time it is curious to observe, that vegetables in respect to their times of sleeping more regularly observe the hour of the day, than the presence or absence of light, or of heat, as may be seen by consulting the calendar of Flora. Botanic Garden, Part II. Canto 2. l. 165. note.

Some diseases, which at first sight might be supposed to be influenced by solar periods, seem to be induced by the increasing sensibility of the system to pain during our sleeping hours; as ex-

plained in Sect. XVIII. 15. Of these are the fits of asthma, of some epilepsies, and of some haemoptoes; all which disturb the patient after some hours sleep, and are therefore to be ascribed to the increase of our dormant sensibility. There may likewise be some doubt, whether the commencement of the pain of gout in the foot, as it generally makes its attack after sleep, should be ascribed to the increased sensibility in sleep, or to solar influence?

M. M. When asthmatic or epileptic fits or haemoptoe occur after a certain number of hours of sleep, the patient should be forcibly awakened before the expected time by an alarm clock, and drink a cup of chocolate or lemonade.—Or a grain of opium should be given at going to bed.—In one case to prevent the too great increase of sensibility by shortening the time of sleep; and in the other by increasing the irritative motions; and expending by that means a part of the sensorial power.

2. *Stadii inanis periodus.* Class III. 1. 2. 2. The cataleptic spasm which preceded the reverie and somnambulation in the patient, whose case is related in Sect. XIX. 2. occurred at exactly the same hour, which was about eleven in the morning, for many weeks; till those periods were disturbed by large doses of opium; and must therefore be referred to some effect of solar gravitation.

tation. In the case of Master A. Sect. XXXIV. 3, as the reverie began early in the morning during sleep, there may be a doubt, whether this commenced with torpor of some organ tattered with solar gravitation; or was caused by the existence of a previous torpid part, which only became so painful as to excite the exertions of reverie by the perpetual increase of sensibility during the continuance of sleep, as in some fits of epilepsy, asthma, and haemoptoe mentioned in the preceding article.

3. *Hemicrania periodus.* Periods of hemicrania. Class IV. 2. 2. 8. The torpor and consequent pain of some membranes on one side of the head, as over one eye, are frequently occasioned by a decaying tooth, and are liable to return every day, or on alternate days at solar or lunar periods. In this case large quantities of the bark will frequently cure the disease, and especially if preceded by venefection and a brisk cathartic; but if the offending tooth can be detected, the most certain cure is its extraction. These partial head-achs are also liable to return at the greater lunar periods, as about once a month. Five drops from a two-ounce phial of a saturated solution of arsenic twice a day for a week or two have been said to prevent the returns of this disease. See a Treatise on Arsenic by Dr. Fowler, of York. Strong sirthines have also been recommended.

4. *Epilepsie*

4. *Epilepsie dolorifica periodus.* Class III. 1. 1. 8. The pain which induces after about an hour the violent convulsions or insanity, which constitute the painful epilepsy, generally observe solar diurnal periods for four or five weeks, and are probably governed by solar and lunar times in respect to their greater periods; for I have observed that the daily paroxysms, unless disturbed by large doses of opium, recur at very nearly the same hour, and after a few weeks the patients have recovered to relapse again at the interval of a few months. But more observations are wanted upon this subject, which might be of great advantage in preventing the attacks of this disease; as much less opium given an hour before its expected daily return will prevent the paroxysm, than is necessary to cure it, after it has commenced.

5. *Convulsionis dolorifica periodus.* Class III. 1. 1. 6. The pains, which produce these convulsions, are generally left after rheumatism, and come on when the patients are become warm in bed, or have been for a short time asleep, and are therefore perhaps rather to be ascribed to the increasing sensibility of the system during sleep, than to solar diurnal periods, as in Species first and second of this Genus.

6. *Tussis periodica periodus.* Periodic cough, Class IV. 2. 1. 9. returns at exact solar periods;

VOL IV.

X

that

that described in Sect. XXXVI. 3. 9. recurred about seven in the afternoon for several weeks, till its periods were disturbed by opium, and then it recurred at eleven at night for about a week, and was then totally destroyed by opium given in very large quantities, after having been previously for a few days omitted.

7. *Catameniæ periodus.* Periods of menstruation. The correspondence of the periods of the catamenia with those of the moon was treated of in Sect. XXXII. 6. and can admit of no more doubt, than that the returns of the tides are governed by lunar influence. But the manner in which this is produced, is less evident; it has commonly been ascribed to some effect of the lunar gravitation on the circulating blood, as mentioned in Sect. XXXII. 6. But it is more analogous to other animal phenomena to suppose that the lunar gravitation immediately affects the solids by its influx or stimulus. Which we believe of the fluid element of heat, in which we are equally immersed; and of the electric fluid, which also surrounds and pervades us. See Sect. XXXVI. 2. 3.

If the torpor of the uterine veins, which induces the monthly periods of the catamenia, be governed by the increase of terrene gravitation; that is, by the deficiency of the counter-influence of solar and lunar gravitation; why does not it occur

occur most frequently when the terrene gravitation is the greatest, as about six hours after the new moon, and next to that at about six hours after the full moon? This question has its difficulty; first, if the terrene gravitation be greatest about six hours after the new moon, it must become less and less about the same time every lunar day, till the end of the first quarter, when it will be the least; it must then increase daily till the full. After the full the terrene gravitation must again decrease till the end of the third quarter, when it will again be the least, and must increase again till the new moon; that is, the solar and lunar counter-gravitation is greatest, when those luminaries are vertical, at the new moon, and full moon, and least about six hours afterwards. If it was known, whether more menstruations occur about six hours after the moon is in the zenith or nadir; and in the second and fourth quarters of the moon, than in the first and third; some light would be thrown on this subject; which must in that respect wait for future observations.

Secondly, if the lunar influence produces a very small degree of quiescence, suppose of the uterine veins, at first; and if that recurs at certain periods, as of lunar days, or about 25 hours, even with less power to produce quiescence than at first; yet the quiescence will daily increase by the acquired habit acting at the same time, as

X 2 explained

explained in Sect. XII. 3. 3. till at length so great a degree of quiescence will be induced as to cause the inaction of the veins of the uterus, and consequent venous hæmorrhage. See Sect. XXXII. 6. Class I. 2. 1. 11. IV. 1. 4. 4. See the introduction to this Genus.

8. *Hemorrhoidis periodus.* The periods of the piles depend on the torpor of the veins of the rectum, and are believed to recur nearly at monthly intervals. See Sect. XXVII. 2. and Class I. 2. 1. 6.

9. *Podagra periodus.* The periods of gout in some patients recur at annual intervals, as in the case related above in Class IV. 1. 2. 15. in which the gouty paroxysm returned for three successive years on nearly the same day of the month. The commencement of the pain of each paroxysm is generally a few hours after midnight, and may thence either be induced by diurnal solar periods, or by the increasing sensibility during sleep, as mentioned in the first species of this genus.

10. *Erysipelas periodus.* Some kinds of erysipelas which probably originate from the association of the cutaneous vessels with a diseased liver, occur at monthly periods, like the haemorrhoids or piles; and others at annual periods, like the gout; as a torpor of some part I suppose always precedes

cedes the erysipelatous inflammation, the periods should accord with the increasing influence of terrene gravitation, as described in the introduction to this Genus, and in Species the seventh of it. Other periods of diseases referable to solar and lunar influence are mentioned in Section XXXVI. and many others will probably be discovered by future observation.

11. *Februm periodus.* Periods of fevers. The commencement of the cold fits of intermittent fevers, and the daily exacerbations of other fevers, so regularly recur at diurnal solar or lunar periods, that it is impossible to deny their connection with gravitation; as explained in Sect. XXXVI. 3. Not only these exacerbations of fever, and their remissions, and the diurnal solar and lunar periods; but the preparatory circumstances, which introduce fevers, or which determine their crises, appear to be governed by the parts of monthly lunar periods, and of solar annual ones. Thus the variolous fever in the natural small-pox commences on the 14th day, and in the inoculated small-pox on the seventh day. The fever and eruption in the distinct kind take up another quarter of a lunation, and the maturation another quarter.

The fever, which is termed canine madness, or hydrophobia, is believed to commence near the new or full moon; and, if the cause is not then great enough to bring on the disease, it seems to

acquire some strength, or to lie dormant, till another, or perhaps more powerful luponation calls it into action. In the spring, about three or four years ago, a mad dog very much worried one swine confined in a sty, and bit another in the same sty in a less degree; the former became mad, refused his meat, was much convulsed, and died in about four days; this disease commenced about a month after the bite. The other swine began to be ill about a month after the first, and died in the same manner.

ORDO.

ORDO III.

Retrograde Associate Motions.

GENUS I.

Catenated with Irritative Motions.

THOSE retrograde associate motions, the first links of which are catenated with irritative motions, belong to this genus. All the retrograde motions are consequent to debility, or inactivity, of the organ; and therefore properly belong to the genera of decreased actions both in this and the former classes.

SPECIES.

1. *Diabetes irritata.* When the absorbents of the intestines are stimulated too strongly by spirit of wine, as in the beginning of drunkenness, the urinary absorbents invert their motions. The same happens from worms in the intestines. In other kinds of diabetes may not the remote cause be the too strong action of the cutaneous absorbents, or of the pulmonary ones? May not in such cases oil externally or internally be of service? or warm bathing for an hour at a time? In hysterical inversions of motion is some other part too much stimulated? or pained from the want of stimulus?

X 4

2. *Sudor*

2. *Sudor frigidus in asthmate.* The cause of the paroxysms of humoral asthma is not well understood; I suppose it to be owing to a torpidity or inaction of the absorbents belonging to the pulmonary vessels, as happens probably to other viscera at the commencement of intermittent fevers, and to a consequent accumulation of fluids in them; which at length producing great irritation or uneasy sensation causes the violent efforts to produce the absorption of it. The motions of the cutaneous absorbent vessels by their association with those of the pulmonary ones become retrograde, and effuse upon the skin a fluid, which is said to be viscid, and which adheres in drops.

A few days ago I saw a young man of delicate constitution in what was called a fit of the asthma; he had about two months before had a peripneumony, and had been ever since subject to difficult respiration on exertion, with occasional palpitation of his heart. He was now seized about eight at night, after some exertion of mind in his business with cold extremities, and difficulty of breathing. He gradually became worse, and in about half an hour, the palpitation of his heart and difficult respiration were very alarming; his whole skin was cold and pale, yet he did not shudder as in cold paroxysm of fever; his tongue from the point to the middle became as cold as his other extremities, with cold breath. He seemed to be in the act of dying, except that his

pulse continued equal in time, though very quick. He lost three ounces of blood, and took ten drops of laudanum with musk and salt of hartshorn, and recovered in an hour or two without any cold sweat.

There being no cold sweat seems to indicate, that there was no accumulation of serous fluid in the lungs; and that their inactivity, and the coldness of the breath, was owing to the sympathy of the air-cells with some distant part. There was no shuddering produced, because the lungs are not sensible to heat and cold; as any one may observe by going from a warm room into a frosty air, and the contrary. So the steam of hot tea, which scalds the mouth, does not affect the lungs with the sensation of heat. I was induced to believe that the whole cold fit might be owing to suppuration in some part of the chest; as the general difficulty of breathing seemed to be increased after a few days with pulse of 120, and other signs of empyema. Do the cold sweat, and the occurrence of the fits of asthma after sleep, distinguish the humoral asthma from the cold paroxysm of intermittents, or that which attends suppuration, or which precedes inflammation?—I heard a few weeks afterwards, that he spit up much matter at the time he died.

3. *Diabetes a timore.* The motions of the absorbent vessels of the neck of the bladder become inverted by their consent with those of the skin; which

which are become torpid by their reverse sympathy with the painful ideas of fear, as in Sect. XVI.
8. 1. whence there is a great discharge of pale urine, as in hysterical diseases.

The same happens from anxiety, where the painful suspense is continued, even when the degree of fear is small; as in young men about to be examined for a degree at the universities the frequency of making water is very observable. When this anxiety is attended with a sleepless night, the quantity of pale urine is amazingly great in some people, and the micturition very frequent.

M. M. Opium. Joy. Consolations of friendship.

4. *Diarrhoea a timore.* The absorbent vessels of the intestines invert their motions by direct consent with the skin; hence many liquid stools as well as much pale urine are liable to accompany continued fear, along with coldness of the skin. The immediate cause of this is the decreased sensorial power of association, which intervenes between the actions of the absorbents of the cold skin, and those of the intestinal absorbents; the motions of the latter become on that account weakened and at length retrograde. The remote cause is the torpor of the vessels of the skin cate-nated with the pain of fear, as explained in Sect. XVI. 8. 1.

The

The capillaries of the skin consent more generally by direct sympathy with those of the lower intestines, and of the bladder; but by reverse sympathy more generally with those of the stomach and upper intestines. As appears in fevers, where the hot skin accompanies indigestion of the stomach; and in diarrhoeas attended with cold extremities.

The remote cause is the torpor of the skin owing to its reverse sympathy with the painful sensual motions, or ideas, of fear; which are now actuated with great energy, so as to deprive the second link of associated motions of their due share of sensorial power. It is also probable, that the pain of fear itself may contribute to exhaust the sensorial power, even when it produces no muscular action. See Class IV, 2. 2.

5. *Pallor et tremor a timore.* A retrograde action of the capillaries of the skin producing palleness, and a torpor of the muscular fibres of the limbs occasioning trembling, are caused by their reverse associations with the ideas or imaginations of fear; which are now actuated with violent energy, and accompanied with great pain. The cause of these associations are explained in Sect. XVI. 8. 1.

These torpid actions of the capillaries and muscles of the limbs are not caused immediately by the painful sensation of fear; as in that case they

they would have been increased and not decreased actions, as occurs in anger; where the painful volition increases the actions of the capillaries, exciting a blush and heat of the skin. Whence we may gain some knowledge of what is meant by depressing and exciting passions; the former consisting of ideas attended with pain, which pain occasions no muscular actions, like the pain of cold head-ach; the latter being attended with volitions, and consequent muscular exertions.

That is, the pain of fear, and the pain of anger, are produced by the exertion of certain ideas, or motions of certain nerves of sense; in the former case, the painful sensation of fear produces no muscular actions, yet it exhausts or employs so much sensorial power, that the whole system acts more feebly, or becomes retrograde; but some parts of it more so than others, according to their early associations described in Sect. XVI. 8. 1. hence the tremor of the limbs, palpitation of heart, and even syncope. In anger the painful volition produces violent muscular actions; but if previous to these any deliberation occurs, a flushed countenance sometimes, and a red skin, are produced by this superabundance of volition exerted on the arterial system; but at other times the skin becomes pale, and the legs tremble, from the exhaustion or expenditure of the sensorial power by the painful volitions of anger on the

the organs of sense, as by the painful sensations of fear above mentioned.

Where the passion of fear exists in a great degree, it exhausts or expends so much sensorial power, either simply by the pain which attends it, or by the violent and perpetual excitement of the terrific imaginations or ideas, that not only a cold and pale skin, but a retrograde motion of the cutaneous absorbents occurs, and a cold sweat appears upon the whole surface of the body, which probably sometimes increases pulmonary absorption; as in Class II. 1. 6. 4. and as in the cold sweats, which attend the paroxysms of humoral asthma. Hence anxiety, which is a continued pain of fear, so universally debilitates the constitution as to occasion a lingering death; which happens much more frequently than is usually supposed; and these victims of continued anxiety are said to die of a broken heart. Other kinds of paleness are described in Class I. 2. 2. 2.

M. M. Opium. Wine. Food. Joy.

6. *Palpitatio cordis a timore.* The palpitation of the heart from fear is owing to the weak action of it, and perhaps sometimes to the retrograde excretion of the ventricles and auricles; because it seems to be affected by its association with the capillaries, the actions of which, with those of the arteries and veins, constitute one great circle of associate motions. Now when the capillaries

of

of the skin become torpid, coldness and paleness succeed ; and with these are associated the capillaries of the lungs, whence difficult respiration ; and with these the weak and retrograde actions of the heart. At the same time the absorbents of the skin, and of the bladder, and of the intestines, sometimes become retrograde, and regurgitate their contents ; as appears by the pale urine in large quantities, which attends hysterical complaints along with this palpitation of the heart ; and from the cold sweats, and diarrhoea ; all which, as well as the hysterical complaints, are liable to be induced or attended by fear.

When fear has still more violently affected the system, there have been instances where syncope, and sudden death, or a total stoppage of the circulation, have succeeded : in these last cases, the pain of fear has employed or exhausted the whole of the sensorial power, so that not only those muscular fibres generally exerted by volition cease to act, whence the patient falls down ; and those, which constitute the organs of sense, whence syncope ; but lastly those, which perform the vital motions, become deprived of sensorial power, and death ensues. See Class I. 2. 1. 4. and I. 2. 1. 10. Similar to this in some epileptic fits the patient first suddenly falls down, without even endeavouring to save himself by his hands before the convulsive motions come on. In this case the great exertion of some small part in conse-

quence of great irritation or sensation exhausts the whole sensorial power, which was lodged in the extremities of the locomotive nerves, for a short time, as in syncope; and as soon as these muscles are again supplied, convulsions supervene to relieve the painful sensation. See Class III.

1. 1. 7.

7. *Abortio a timore.* Women miscarry much more frequently from a fright, than from bodily injury. A torpor or retrograde motion of the capillary arteries of the internal uterus is probably the immediate cause of these miscarriages, owing to the association of the actions of those vessels with the capillaries of the skin, which are rendered torpid or retrograde by fear. By this contraction of the uterine arteries, the fine vessels of the placenta, which are inserted into them, are detrued, or otherwise so affected, that the placenta separates at this time from the uterus, and the fetus dies from want of oxygenation. A strong young woman, in the fifth or sixth month of her pregnancy, who has since borne many children, went into her cellar to draw beer; one of her servant boys was hid behind a barrel, and started out to surprise her, believing her to be the maid-servant; she began to flood immediately, and miscarried in a few hours. See Sect. XXXIX. 6. 5. and Class I. 2. 1. 14.

8. *Hysteria a timore.* Some delicate ladies are liable

liable to fall into hysterical fits from sudden fright. The peristaltic motions of the bowels and stomach, and those of the oesophagus, make a part of the great circle of irritative motions with those of the skin, and many other membranes. Hence when the cutaneous vessels become torpid from their reverse sympathy with the painful ideas of fear; these of the bowels, and stomach, and oesophagus, become first torpid by direct sympathy with those of the skin, and then feebly and ineffectually invert the order of their motions, which constitutes a paroxysm of the hysterical disease. See Class I. 3. 1. 10. These hysterical paroxysms are sometimes followed by convulsions, which belong to Class III. as they are exertions to relieve pain; and sometimes by death. See Species 9. of this Genus, and Class I. 2. 1. 4.

Indigestion from fear is to be ascribed in the same manner to the torpor of the stomach, owing to its association with the skin. As in Class IV, 1. 2. 5. IV. 2. 1.

ORDO

ORDO III.

Retrograde Associate Motions.

GENUS II.

Catered with Sensitive Motions.

SPECIES.

1. *Nausea idealis.* Nausea from disgusting ideas, as from nauseous stories, or disgusting sights, or smells, or tastes, as well as vomiting from the same causes, consists in the retrograde actions of the lymphatics of the throat, and of the oesophagus, and stomach; which are associated with the disgusting ideas, or sensual motions of sight, or hearing, or smell, or taste; for as these are decreased motions of the lymphatics, or of the oesophagus, or stomach, they cannot immediately be excited by the sensorial power of painful sensation, as in that case they ought to be increased motions. So much sensorial power is employed for a time on the disgusting idea, or expended in the production of inactive pain, which attends it, that the other parts of the associated chain of action, of which this disgusting idea is now become a link, are deprived of their accustomed share; and therefore first stop, and then invert their motions. Owing to defi-

ciency of sensorial power, as explained more at large in Sect. XXXV. 1. 3.

2. *Nausea a conceptu.* The nausea, which pregnant women are so subject to during the first part of gestation, is owing to the reverse sympathy between the uterus and stomach, so that the increased action of the former, excited by the stimulus of the growing embryo, which I believe is sometimes attended with sensation, produces decreased actions of the latter with the disagreeable sensation of sickness with indigestion and consequent acidity. When the fetus acquires so much muscular power as to move its limbs, or to turn itself, which is called quickening, this sickness of pregnancy generally ceases.

M. M. Calcined magnesia. Rhubarb. Half a grain of opium twice a day. Recumbent posture on a sofa.

3. *Vomitio vertiginosa.* Sea-sickness, the irritative motions of vision, by which we balance ourselves, and preserve our perpendicularity, are disturbed by the indistinctness of their objects; which is either owing to the similarity of them, or to their distance, or to their apparent or unusual motions. Hence these irritative motions of vision are exerted with greater energy, and are in consequence attended with sensation; which at first is agreeable, as when children swing on a

rope ; afterwards the irritative motions of the stomach, and of the absorbent vessels, which open their mouths into it, become inverted by their associations with them by reverse sympathy.

For the action of vomiting, as well as the disagreeable sensation of sickness, are shewn to be occasioned by defect of the sensorial power ; which in this case is owing to the greater expenditure of it by the sense of vision. On the same account the vomiting, which attends the passage of a stone through the ureter, or an inflammation of the bowels, or the commencement of some fevers, is caused by the increased expenditure of the sensorial power by the too great action of some links of the associations of irritative motions ; and there being in consequence a deficiency of the quantity required for other links of this great catenation.

It must be observed, that the expenditure of sensorial power by the retinas of the eyes is very great ; which may be estimated by the perpetual use of those organs during our waking hours, and during most of our sleeping ones ; and by the large diameters of the two optic nerves, which are nearly the size of a quill, or equal to some of the principal nerves, which serve the limbs.

4. *Vomitio a calculo in uretere.* The action of vomiting in consequence of the increased or decreased actions of the ureter, when a stone lodges

in it. The natural actions of the stomach, which consist of motions subject to intermittent irritations from the fluids, which pass through it, are associated with those of the ureter; and become torpid, and consequently retrograde, by intervals, when the actions of the ureter become torpid owing to previous great stimulus from the stone it contains; as appears from the vomiting existing when the pain is least. When the motions of the ureter are thus lessened, the sensorial power of association, which ought to actuate the stomach along with the sensorial power of irritation, ceases to be excited into action; and in consequence the actions of the stomach become less energetic, and in consequence retrograde.

For as vomiting is a decreased action of the stomach, as explained in Sect. XXXV. 1. 3. it cannot be supposed to be produced by the pain of gravel in the ureter alone, as it should then be an increased action, not a decreased one...

The perpetual vomiting in ileus is caused in like manner by the defective excitement of the sensorial power of association by the bowel, which is torpid during the intervals of pain; and the stomach sympathizes with it. See Enteritis, Class II. 1. 2. 11. Does this symptom of vomiting indicate, whether the disease be above or below the valve of the colon? Does not the softer pulse in some kinds of enteritis depend on the

sympathy of the heart and arteries with the sickness of the stomach? See Heus and Cholera.

Hence this sickness, as well as the sickness in some fevers, cannot be esteemed an effort of nature to dislodge any offensive material; but like the sea-sickness described above, and in Sect. XX. 4. is the consequence of the associations of irritative or sensitive motions. See Class I. 1. 3. 9.

5. *Vomitio ab insultu paralytico.* Paralytic affections generally commence with vomiting, the same frequently happens from a violent blow with a stick on the head; this curious connection of the brain and stomach has not been explained; as it resembles the sickness in consequence of vertigo at sea, it would seem to arise from a similar cause, viz. from disturbed irritative or sensitive associations.

6. *Vomitio a titillatione faucium.* If the throat be slightly tickled with a feather, a nausea is produced, that is, an inverted action of the mouths of the lymphatics of the fauces, and by direct sympathy an inverted action of the stomach ensues. As these parts have frequently been stimulated at the same time into pleasurable action by the deglutition of our daily aliment, their actions become strongly associated. And as all the food we swallow, is either moist originally, or mixed with our moist saliva in the mouth; a

feather, which is originally dry, and which in some measure repels the moist saliva, is disagreeable to the touch of the fauces; at the same time this nausea and vomiting cannot be caused by disagreeable sensation simply, as then they ought to have been increased exertions, and not decreased ones, as shewn in Section XXXV. 1. 3. But the mouths of the lymphatics of the fauces are stimulated by the dry feather into too great action for a time, and become retrograde afterwards by the debility consequent to too great previous stimulus.

7. *Vomitio cœti sympathetica.* Vomiting is successfully stopped by the application of a blister on the back in some fevers, where the extremities are cold, and the skin pale. It was stopped by Sydenham by producing a sweat on the skin by covering the head with the bedclothes. See Class IV. 1. 1. 3. and Suppl. I. 11. 6.

ORDO

ORDO III.

Retrograde Associate Motions.

GENUS III.

Catenated with Voluntary Motions.

SPECIES.

1. *Ruminatio.* In the ruminatio of horned cattle the food is brought up from the first stomach by the retrograde motions of the stomach and oesophagus, which are catenated with the voluntary motions of the abdominal muscles.

2. *Vomitio voluntaria.* Voluntary vomiting. Some human subjects have been said to have obtained this power of voluntary action over the retrograde motions of the stomach and oesophagus, and thus to have been able to empty their stomach at pleasure. See Sect. XXV. 6. This voluntary act of emptying the stomach is possessed by some birds, as the pigeon; who has an organ for secreting milk in its stomach, as Mr. Hunter observed; and softens the food for its young by previously swallowing it; and afterwards putting its bill into theirs returns it into their mouths. See Sect. XXXIX. 4. 8. The pelicans use a stomach, or throat bag, for the purpose of bringing the fish, which they catch in the sea to shore,

Y 4.

and

and then eject them, and eat them at their leisure. See Sect. XVI. 11. And I am well informed of a bitch, who having puppies in a stable at a distance from the house, swallowed the flesh-meat, which was given her, in large pieces, and carrying it immediately to her whelps, brought it up out of her stomach, and laid it down before them.

3. *Eructatio voluntaria.* Voluntary eructation. Some, who have weak digestions, and thence have frequently been induced to eruct the quantity of air discharged from the fermenting aliment in their stomachs, have gradually obtained a power of voluntary eructation, and have been able thus to bring up hogheads of air from their stomachs, whenever they pleased. This great quantity of air is to be ascribed to the increase of the fermentation of the aliment by drawing off the gas as soon as it is produced. See Sect. XXIII. 4.

ORDO

ORDO III.

Retrograde Associate Motions.

GENUS IV.

Catenated with External Influences.

SPECIES.

1. *Catarrhus periodicus.* Periodical catarrh is not a very uncommon disease; there is a great discharge of a thin saline mucous material from the membranes of the nostrils, and probably from the maxillary and frontal sinuses, which recur once a day at exact solar periods; unless it be disturbed by exhibition of opium; and resembles the periodic cough mentioned below. See Class I, 3. 2. 1. It is probably owing to the retrograde action of the lymphatics of the membranes affected, and produced immediately by solar influence.

2. *Tussis periodica.* Periodic cough, called nervous cough, and tussis ferina. It seems to arise from a periodic retrograde action of the lymphatics of the membrane, which lines the air-cells of the lungs. And the action of coughing, which is violent for an hour or longer, is probably excited by the stimulus of the thin fluid thus produced,

produced, as well as by the disagreeable sensation attending membranous inactivity ; and resembles periodic catarrh not only in its situation on a mucous membrane, but in the discharge of a thin fluid. As it is partly restrainable, it does not come under the name of convulsion ; and as it is not attended with difficult respiration, it cannot be called asthma ; it is cured by very large doses of opium, see a case and cure in Sect. XXXVI. 3. 9. see Class IV. 2. 4. 6. and seems immediately to be induced by solar influence.

3. *Hyysteria a frigore.* Hysteric paroxysms are occasioned by whatever suddenly debilitates the system, as fear, or cold, and perhaps sometimes by external moisture of the air, as all delicate people have their days of greater or less debility, see Class IV. 3. 1. 8.

4. *Nausea pluvialis.* Sickness at the commencement of a rainy season is very common among dogs, who assist themselves by eating the agrostis canina, or dog's grass, and thus empty their stomachs. The same occurs with less frequency to cats, who make use of the same expedient. See Sect. XVI. 11. I have known one person, who from his early years has always been sick at the beginning of wet weather, and still continues so. Is this owing to a sympathy of the mucous membrane of the stomach with the mechanical relaxation

ation of the external cuticle by a moister atmosphere, as is seen in the corrugated cuticle of the hands of washer-women? or does it sympathize with the mucous membrane of the lungs, which must be affected along with the mucus on its surface by the respiration of a moister atmosphere?

SUPPLEMENT.

S U P P L E M E N T

TO

C L A S S IV.

Sympathetic Theory of Fever.

As fever consists in the increase or diminution of direct or reverse associated motions, whatever may have been the remote cause of them, it properly belongs to the fourth class of diseases; and is introduced at the end of the class, that its great difficulties might receive elucidation from the preceding parts of it. These I shall endeavour to enumerate under the following heads, trusting that the candid reader will discover in these rudiments of the theory of fever a nascent embryo, an infant Hercules, which Time may rear to maturity, and render serviceable to mankind.

- I. Simple fever of two kinds.
- II. Compound fever.
- III. Termination of the cold fit.
- IV. Return of the cold fit.
- V. Sensation excited in fever.
- VI. Circles of associated motions.

VII. Alter-

- VII. Alternations of cold and hot fits.
- VIII. Orgasm of the capillaries.
- IX. Torpor of the lungs.
- X. Torpor of the brain.
- XI. Torpor of the heart and arteries.
- XII. Torpor of the stomach and intestines.
- XIII. Case of continued fever explained.
- XIV. Termination of continued fever.
- XV. Inflammation excited in fever.
- XVI. Recapitulation.

I. *Simple Fever.*

1. When a small part of the cutaneous capillaries with their mucous or perspirative glands are for a short time exposed to a colder medium, as when the hands are immersed in iced water for a minute, these capillary vessels and their glands become torpid or quiescent, owing to the abdication of the stimulus of heat. The skin then becomes pale, because no blood passes through the external capillaries; and appears shrunk, because their sides are collapsed from inactivity, not contracted by spasm; the roots of the hair are left prominent from the receding or subsiding of the skin around them; and the pain of coldness is produced.

In this situation, if the usual degree of warmth be applied, these vessels regain their activity; and having now become more irritable from an accumulation

mulation of the sensorial power of irritation during their quiescence, a greater exertion of them follows, with an increased glow of the skin, and another kind of pain, which is called the hot-ach; but no fever, properly so called, is yet produced; as this effect is not universal, nor permanent, nor recurrent.

2. If a greater part of the cutaneous capillaries with their mucous and perspirative glands be exposed for a longer time to cold, the torpor or quiescence becomes extended by direct sympathy to the heart and arteries; which is known by the weakness, and consequent frequency of the pulse in cold fits of fever.

This requires to be further explained. The movements of the heart and arteries, and the whole of the circulatory vessels, are in general excited into action by the two sensorial powers of irritation, and of association. The former is excited by stimulus, the latter by the previous actions of a part of the vital circle of motions. In the above situation the capillaries act weakly from defect of irritation, which is caused by deficient stimulus of heat; but the heart and arteries act weakly from defect of association, which is owing to the weak action of the capillaries; which does not now excite the sensorial power of association into action with sufficient energy.

After a time, either by the application of warmth,

warmth, or by the increase of their irritability owing to the accumulation of the sensorial power of irritation during their previous quiescence, the capillary vessels and glands act with greater energy than natural ; whence the red colour and heat of the skin. The heart and arteries acquire a greater strength of pulsation, and continue the frequency of it, owing to the accumulation of the sensorial power of association during their previous torpor, and their consequent greater associability : which is now also more strongly excited by the increased actions of the capillaries. And thus a fit of simple fever is produced, which is termed *Febris irritativa* ; and consists of a torpor of the cutaneous capillaries with their mucous and perspirable glands, accompanied with a torpor of the heart and arteries ; and afterwards of an increased action of all these vessels, by what is termed *direct sympathy*.

This fever, with strong pulse without inflammation, or *febris irritativa*, described in Class I. 1. 1. 1. is frequently seen in vernal intermitents, as the orgasm of the heart and arteries is then occasioned by their previous state of torpor ; but more rarely I believe exists in the type of continued fever, except there be an evident remission, or approximation to a cold fit ; at which time a new accumulation of the sensorial power of association is produced ; which afterwards actuates the heart and arteries with unnatural vigour ; or unless

unless there be some stimulus perpetually acting on the system, so as to induce an increased secretion of sensorial power in the brain, as occurs in slight degrees of intoxication. Since without one or other of these circumstances in continued fevers without inflammation, that is, without the additional sensorial power of sensation being introduced, it seems difficult to account for the production of so great a quantity of sensorial power, as must be necessary to give perpetual increase of action to the whole sanguiferous system.

3. On the contrary, while the cutaneous capillaries with their mucous and perspirative glands acquire an increased irritability, as above, by the accumulation of that sensorial power during their previous quiescence, and thus constitute the hot fit of fever; if the heart and arteries do not acquire any increase of associability, but continue in their state of torpor, another kind of simple fever is produced; which is generally of the continued kind, and is termed *Febris inirritativa*; which consists of a previous torpor of the capillaries of the skin, and of the heart and arteries by direct sympathy with them; and afterwards of an orgasm or increased action of the capillaries of the skin, with a decreased action, or continued torpor, of the heart and arteries by reverse sympathy with them. This orgasm of the cutaneous capillaries, which appears by the blush and heat of the skin, is at first owing to the accumulation of the sen-

atorial power of irritation during their previous torpid state, as in the febris irritata above described; but which is afterwards supported or continued by the reverse sympathy of these capillaries with the torpid state of the heart and arteries, as will be further explained in article 8 of this Supplement.

4. The renovated activity of the capillaries commences as soon or sooner than that of the heart and arteries after the cold fit of irritative fever; and is not owing to their being forced open by the blood being impelled into them mechanically, by the renovated action of the heart and arteries; for these capillaries of the skin have greater mobility than the heart and arteries, as appears in the sudden blush of shame; which may be owing to their being more liable to perpetual varieties of activity from their exposure to the vicissitudes of atmospheric heat. And because in inirritative fevers, or those with arterial debility, the capillaries acquire increased strength, as is evinced by the heat of the skin, while the pulsations of the heart and arteries remain feeble.

5. It was said above, that the cutaneous capillaries, when they were rendered torpid by exposure to cold, either recovered their activity by the reapplication of external warmth; or by their
increased

increased irritability, which is caused by the accumulation of that sensorial power during their quiescence. An example of the former of these may be seen on emerging from a very cold bath ; which produces a fit of simple fever ; the cold fit, and consequent hot fit, of which may be prolonged by continuing in the bath ; which has indeed proved fatal to some weak and delicate people, and to others after having been much exhausted by heat and exercise. See Sect. XXXII. 3. 2. An example of the latter may be taken from going into a bath of about eighty degrees of heat, as into the bath at Buxton, where the bather first feels a chill, and after a minute becomes warm, though he remains in the same medium, owing to the increase of irritability from the accumulation of that sensorial power during the short time which the chilness continued.

6. Hence simple fevers are of two kinds ; first, the febris irritativa, or fever with strong pulse ; which consists of a previous torpor of the heart, arteries, and capillaries, and a succeeding orgasm of those vessels. Secondly, the febris inirritativa, or fever with weak pulse, which consists of a previous torpor of the heart, arteries, and capillaries ; and of a succeeding orgasm of the capillaries, the torpor of the heart and arteries continuing. But as the frequency of the pulse occurs both in the state of torpor, and in that of orgasm, of the heart

and arteries; this constitutes a criterion to distinguish fever from other diseases, which are owing to the torpor of some parts of the system, as paresis, and hemicrania.

7. The reader will please to observe, that where the cutaneous or pulmonary capillaries are mentioned, their mucous and perspirative glands are to be understood as included; but that the absorbents belonging to those systems of vessels, and the commencement of the veins, are not always included; as these are liable to torpor separately, as in anasarca, and petechiæ; or to orgasm, or increased action, as in the exhibition of strong emetics, or in the application of vinegar to the lips; yet he will also please to observe, that an increased or decreased action of these absorbents and veins generally occurs along with that of the capillaries, as appears by the dry skin in hot fits of fever; and from there being generally at the same time no accumulation of venous blood in the cutaneous vessels, which would appear by its purple colour.

II. *Compound Fever.*

1. When other parts of the system sympathize with this torpor and orgasm of the cutaneous capillaries, and of the heart and arteries; the fever-fit becomes more complicated and dangerous;

ous; and this in proportion to the number and consequence of such affected parts. Thus if the lungs become affected, as in going into very cold water, a shortness of breath occurs; which is owing to the collapse or inactivity (not to the active contraction, or spasm), of the pulmonary capillaries; which, as the lungs are not sensible to cold, are not subject to painful sensation, and consequent shuddering, like the skin. In this case after a time the pulmonary capillaries, like the cutaneous ones, act with increased energy; the breathing, which was before quick, and the air thrown out at each respiration in less quantity, and cool to the back of the hand opposed to it, now becomes larger in quantity, and warmer than natural; which however is not accompanied with the sensation of heat in the membrane, which lines the air-vessels of the lungs, as in the skin.

2. One consequence of this increased heat of the breath is the increased evaporation of the mucus on the tongue and nostrils. A viscid material is secreted by these membranes to preserve them moist and supple, for the purposes of the senses of taste and of smell, which are extended beneath their surfaces; this viscid mucus, when the aqueous part of it is evaporated by the increased heat of the respiration, or is absorbed by the too great action of the mucous absorbents, adheres

closely on those membranes, and is not without difficulty to be separated from them. This dryness of the tongue and nostrils is a circumstance therefore worthy to be attended to; as it shews the increased action of the pulmonary capillaries, and the consequent increased heat of the expired air; and may thus indicate, when colder air should be admitted to the patient. See Class I. 1. 3. 1. The middle part of the tongue becomes dry sooner, and recovers its moisture later, than the edges of it; because the currents of respired air pass most over the middle part of it. This however is not the case, when the dryness of the tongue is owing only to the increased mucous absorption. When however a frequent cough attends pulmonary inflammation, the edges of the tongue are liable to be as much furred as the middle of it; as during the action of coughing the middle of the tongue is depressed, so as to form half a cylinder, to give a greater aperture for the emission of air from the larynx; and the edges of it become thus as much exposed to the currents of air, as the middle parts of it.

3. When the internal capillaries or glands sympathize with the cutaneous capillaries; or when any of them are previously affected with torpor, and the external or cutaneous capillaries are affected secondarily; other symptoms are produced, which render the paroxysms of fever still

more

more complicate. Thus if the spleen or pancreas are primarily or secondarily affected, so as to be rendered torpid or quiescent, they are liable to become enlarged, and to remain so even after the extinction of the fever-fit. These in some intermittent fevers are perceptible to the hand; and are called ague-cakes; their tumour seems to be owing to the permanent torpor of the absorbent system, the secerning vessels continuing to act some time afterwards. If the seceretary vessels of the liver are affected first with torpor, and afterwards with orgasm, a greater secretion of bile is produced, which sometimes causes a diarrhoea. If a torpor of the kidneys, and of the absorbents of the bladder occurs, either primarily, or by sympathy with the cutaneous capillaries, the urine is in small quantity and pale, as explained in Class I. 2. 2. 5.; and if these seceretary vessels of the kidneys, and the absorbents of the bladder act more strongly than natural afterwards by their increased irritability or assueability, the urine becomes in larger quantity, and deeper coloured, or deposits its earthy parts, as in Class I. 1. 2. 4. which has been esteemed a favourable circumstance. But if the urine be in small quantity, and no sediment appears in it, after the hot fit is over; it shews that the secerning vessels of the kidneys and the absorbent vessels of the bladder have not regained the whole of their activity;

and the case indicates a greater tendency to a return of the cold fit.

4. When the stomach is affected with torpor either primarily; or secondarily by its sympathy with the cutaneous capillaries; or with some internal viscera; sickness occurs, with a total want of appetite to any thing solid; vomiting then supervenes, which may often be relieved by a blister on the skin, if the skin be cool and pale; but not if it be hot and flushed. The intestines cease to perform their office of absorption from a similar torpor; and a diarrhoea supervenes owing to the acrimony of their putrid, or of their acid contents. The loose undigested or fetid stools indicate the inability of the intestines to perform their proper office; as the mucus and gastric acid, which are vomited up, does that of the stomach; this torpor of the stomach is liable to continue after the cold paroxysm ceases, and to convert intermittent fevers into continued ones by its direct sympathy with the heart and arteries. See article 10 of this Supplement.

5. If the meninges of the brain sympathize with other torpid parts, or are primarily affected, delirium, stupor, and perhaps hydrocephalus internus, occur, see Class II. 1. 7. 1. and I. 2. 5. 10; and sometimes the pulse becomes slow, producing paresis

pareisis instead of fever. But if the membranes, which cover the muscles about the head, or of the pericranium, become torpid by their sympathy with other torpid parts, or are primarily affected, a head-ach supervenes; which however generally ceases with the cold paroxysm of fever. For as when the sensorial power of volition is exhausted by labour, a few hours, or half a solar day, passed in sleep recruits the system by accumulation of this sensorial power; so when the sensorial power of irritation is exhausted, one or two solar or lunar days of rest or quiescence of the affected part will generally restore its action by accumulation of irritability, and consequent increase of association, as in hemicrania, Class IV.

2. 2. 8. But when the heart and arteries become torpid, either primarily, or by their sympathy with the stomach, this accumulation of the sensorial power of irritation can take place but slowly; *as to rest is death!* This explains the cause of the duration of fevers with weak pulse, which continue a quarter, or half, or three quarters, or a whole lunation, or still longer, before sufficient accumulation of irritability can be produced to restore their natural strength of action.

6. If the absorbent vessels, which are spread around the neck of the bladder, become torpid by their direct sympathy with the absorbents of the skin in cold fits of fever; the urine, which is poured

poured into the bladder in but small quantity from the torpid kidneys, has nevertheless none of its aqueous saline part reabsorbed ; and this saline part stimulates the bladder to empty itself frequently, though the urine is in small quantity. Which is not therefore owing to any supposed spasm of the bladder, for the action of it in excluding the urine is weak, and as much controllable by the will as in ordinary micturition.

7. If the beginnings or absorbent mouths of the venous system remain torpid, petechiae or vibices are produced in fevers, similar to those which are seen in scurvy without fever. If the skin was frequently moistened for an hour, and at the same time exposed to the common air, or to oxygen gas, it might contribute to turn the black colour of these points of extravasated blood into scarlet, and thus by increasing its stimulus facilitate its reabsorption ? For oxygen gas penetrates moist animal membranes though not dry ones, as in the lungs during respiration. See Class I. 2. 1. 17.

8. When the sensorial power of sensation is introduced into the arterial system, other kinds of compound fevers are produced, which will be spoken of in their place.

III. *Termination*

III. *Termination of the cold Fit.*

1. If all the parts, which were affected with torpor, regain their irritability, and associability, the cold paroxysm of fever ceases; but as some of the parts affected were previously accustomed to incessant action, as the heart and arteries, and others only to intermittent action, as the stomach and intestines; and as those, which are subjected during health to perpetual action, accumulate sensorial power faster, when their motions are impeded, than those which are subjected to intermittent action; it happens, that some of the parts, which were affected with torpor during the cold fit, recover their irritability or associability sooner than others, and more perfectly, or acquire a greater quantity of them than natural; as appears by the partial heat and flushings previous to the general hot fit.

Hence if all the parts, which were previously torpid, regain their due degree of irritability, or of associability, the disease is removed, and health restored. If some or all of them acquire more than their natural degree of these sensorial powers; increased actions, and consequent increased secretions, and greater heat occur, and constitute the hot fit of fever. If after this hot fit of fever all the parts, which had acquired too great irritability, or associability, regain their natural degree of

of it; the disease is removed, and health restored. But if some of these parts do not regain their natural degree of these sensorial powers, the actions of those parts remain imperfect, and are more or less injurious to the system, according to the importance of their functions.

2. Thus if a torpor of the heart and arteries remains; the quick pulse without strength, which began in the cold fit, persists; and a continued fever is produced. If the torpor of the stomach and intestines remains, which is known by sickness and undigested stools, the fever is liable to be of considerable length and danger; the same if the kidneys and absorbent system retain some degree of torpor, as is shewn by the pale urine in not unusual quantity. If part of the absorbent system remains torpid, as the absorbent vessels of the spleen, a tumour of that viscus occurs, which may be felt by the hand; the same sometimes happens to the liver; and these from their tendency to more complete torpor are afterwards liable to give occasion to a return of the cold fit. If the cellular absorbents do not completely recover their activity, a pale and bloated countenance with swelled legs marks their want of action.

3. As the termination of the cold fit is owing to the accumulation of the sensorial power of irritation

irritation and of association during the previous quiescence of the system; and as those parts, which are in perpetual action during health, are more subject to this accumulation during their torpor, or quiescence; one should have imagined, that the heart and arteries would acquire this accumulation of sensorial power sooner or in greater degree than other parts. This indeed so happens, where the pulse is previously strong, as in febris irritativa; or where another sensorial power, as that of sensation, is exerted on the arterial system, as in inflammations. The heart and arteries in these cases soon recover from their torpor, and are exerted with great violence.

Many other parts of the system subject to perpetual motion in health may rest for a time without much inconvenience to the whole; as when the fingers of some people become cold and pale; and during this complete rest great accumulation of irritability may be produced. But where the heart and arteries are previously feeble, they cannot much diminish their actions, and certainly cannot rest entirely, for that would be death; and therefore in this case their accumulation of the sensorial power of irritation or of association is slowly produced, and a long fever supervenes in consequence; or sudden death, as frequently happens, terminates the cold fit.

Whence it appears, that in fevers with weak pulse, if the action of the heart, arteries, and capillaries

pillaries could be diminished, or stopped for a short time without occasioning the death of the patient, as happens in cold bathing, or to persons apparently drowned; that a great accumulation of the sensorial powers of irritation or of association might soon be produced, and the pulse become stronger, and consequently slower, and the fever cease. Hence cold ablution may be of service in fevers with weak pulse, by preventing the expenditure and producing accumulation of the sensorial power of irritation or association. Stupor may be useful on the same account. Could a centrifugal swing be serviceable for this purpose, either by placing the head or the feet in the outward part of the circle, as described in Art. 15. 7. of this Supplement?

IV. *Return of the cold Fit.*

1. If the increased action of the cutaneous and pulmonary capillaries, and of the heart and arteries, in febris irritativa, continues long and with violence, a proportional expenditure or exhaustion of sensorial power occurs; which by its tendency to induce torpor of some part, or of the whole, brings on a return of the cold fit.
2. Another cause which contributes to induce torpor of the whole system by the sympathy of its parts

parts with each other, is the remaining torpor of some viscus; which after the last cold paroxysm had not recovered itself, as of the spleen, liver, kidneys, or of the stomach and intestines, or absorbent vessels, as above mentioned.

3. Other causes are the deficiency of the natural stimuli, as hunger, thirst, and want of fresh air. Other causes are great fatigue, want of rest, fear, grief, or anxiety of mind. And lastly, the influence of external ethereal fluids, as the defect of external heat, and of solar or lunar gravitation. Of the latter the return of the paroxysms of continued fevers about six o'clock in the evening, when the solar gravitation is the least, affords an example of the influence of it; and the usual periods of intermittents, whether quotidian, tertian, or quartan, which so regularly obey solar or lunar days, afford instances of the influence of those luminaries on these kinds of fevers.

4. If the tendency to torpor of some viscus is considerable, this will be increased at the time, when the terrene gravitation is greatest, as explained in the introduction to Class IV. 2. 4. and may either produce a cold paroxysm of quotidian fever; or it may not yet be sufficient in quantity for that purpose, but may nevertheless become greater, and continue so till the next period of the greatest terrene gravitation, and may then either produce

produce a paroxysm of tertian fever; or may still become greater, and continue so till the next period of greatest terrene gravitation, and then produce a paroxysm of quartan ague. And lastly, the periodical times of these paroxysms may exceed, or fall short of, the time of greatest diurnal terrene gravitation according to the time of day, or period of the moon, in which the first fit began; that is, whether the diurnal terrene gravitation was then in an increasing or decreasing state.

V. *Sensation excited in Fever.*

1. A curious observation is related by Dr. Fordyce in his Tract on Simple fever, page 168. He asserts, that those people, who have been confined some time in a very warm atmosphere, as of 120 or 130 degrees of heat, do not feel cold, nor are subject to paleness of their skins, on coming into a temperature of 30 or 40 degrees; which would produce great paleness and painful sensation of coldness in those, who had been some time confined in an atmosphere of only 80 or 90 degrees. Analogous to this, an observing friend of mine assured me, that once having sat up to a very late hour with three or four very ingenuous and humorous companions, and drunk a considerable quantity of wine; both contrary to his usual habits of life; and being obliged

to rise early, and to ride a long journey on the next day; he expected to have found himself weak and soon fatigued; but on the contrary he performed his journey with unusual ease and alacrity; and frequently laughed, as he rode, at the wit of the preceding evening. In both these cases a degree of pain or pleasure actuated the system; and thus a sensorial power, that of sensation, was superadded to that of irritation, or volition. See Sect. XXXIV. 2. 6.

2. Similar to this, when the energetic exertions of some parts of the system in the hot fit of fever arise to a certain excess, a degree of sensation is produced, as of heat, which particularly increases the actions of the cutaneous vessels, which are more liable to be excited by this stimulus. When this additional sensorial power of sensation exists to a greater degree, the pulse, which was before full, now becomes hard, owing to the inflammation of the *vasa vasorum*, or coats of the arteries. In these cases, whether there is any topical inflammation or not, the fever ceases to intermit; but nevertheless there are daily remissions and exacerbations of it; which recur for the most part about six in the evening, when the solar gravitation is the least, as mentioned in Sect. XXXVI. 3. 7.

3. Thus the introduction of another sensorial power, that of sensation, converts an intermittent fever into a continued one. If it be attended with strong pulse, it is termed febris sensitiva irritata, or pyrexia, or inflammation; if with a weak pulse, it is termed febris sensitiva inirritata, or typhus gravior, or malignant fever. The seat of the inflammation is in the glandular or capillary system, as it consists in the secretion of new fluids, or new fibres, which form new vessels, as they harden, like the silk of the silk-worm. See Art 15. of this Supplement.

VI. *Circles of irritative Associate Motions.*

1. There are some associate motions, which are perpetually proceeding in our waking hours, and are catenated by their first link, or in some subsequent parts of the chain, with the stimuli or the influence of external things; which we shall here enumerate, as they contribute to the knowledge of fever. Of these are the irritative ideas, or sensual motions of the organs of sense, and the muscular motions associated with them; which, when the chain is disturbed or interrupted, excite the sensorial power of sensation, and proceed in confusion. Thus if the irritative ideas of sight are disturbed, the parallactic motions of objects, which

which in general are unperceived, become sensible to us; and the locomotive muscles associated with them, which ought to preserve the body erect, stagger from this decrease or interruption of the sensorial power of association; and vertigo is produced.

When the irritative sensual motions, or ideas, belonging to one sense are increased or diminished, the irritative sensual motions, or ideas, of the other senses are liable to become disturbed by their general catenations; whence occur noises in the ears, bad tastes in the mouth, bad odours, and numbness or tingling of the limbs, as a greater or less number of senses are affected. These constitute concomitant circles of disturbed irritative ideas; or make a part of the great circle of irritative ideas, or motions of the organs of sense; and when thus disturbed occasion many kinds of hallucination of our other senses, or attend on the vertigo of vision.

2. Another great circle of irritative associated motions consists of those of the alimentary canal; which are catenated with stimuli or with influences external to the system, but continue to be exerted in our sleeping as well as in our waking hours. When these associations of motion are disturbed by the too great or too small stimulus of the food taken into the stomach, or by the too

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great excess or deprivation of heat, or by indigestible substances, or by torpor or orgasm occasioned by their association with other parts, various diseases are induced under the names of apepsia, hypochondriasis, hysteria, diarrhoea, cholera, ileus, nephritis, fever.

3. A third circle of irritative associate motions consists of those of the absorbent system ; which may be divided into two, the lacteals, and the lymphatics. When the stomach and intestines are recently filled with food and fluid, the lacteal system is stimulated into great action ; at the same time the cellular, cutaneous, and pulmonary lymphatics act with less energy ; because less fluid is then wanted from those branches, and because more sensorial power is expended by the lacteal branch. On this account these two systems of absorbents are liable to act by reverse sympathy ; hence pale urine is made after a full dinner, as less of the aqueous part of it is imbibed by the urinary lymphatics ; and hence the water in anasarca of the lungs and limbs is speedily absorbed, when the actions of the lacteals of the stomach or intestines are weakened or inverted by the exhibition of those drugs, which produce nausea, or by violent vomiting, or violent cathartics.

Hence in diabetes the lacteal system acts strongly,

strongly, at the same time that the urinary lymphatics invert their motions, and transmit the chyle into the bladder; and in diarrhoea from crapula, or too great a quantity of food and fluid taken at a time, the lacteals act strongly, and absorb chyle or fluids from the stomach and upper intestines; while the lymphatics of the lower intestines revert their motions, and transmit this over-repletion into the lower intestines, and thus produce diarrhoea; which accounts for the speedy operation of some cathartic drugs, when much fluid is taken along with them.

4. Other circles of irritative associate motions of great importance are those of the secreting system; of these are the motions of the larger congeries of glands, which form the liver, spleen, pancreas, gastric glands, kidneys, salivary glands, and many others; some of which act by direct and others by reverse sympathy with each other. Thus when the gastric glands act most powerfully, as when the stomach is filled with food, the kidneys act with less energy; as is shewn by the small secretion of urine for the first hour or two after dinner; which reverse sympathy is occasioned by the greater expenditure of sensorial power on the gastric glands, and to the newly absorbed fluids not yet being sufficiently animalized,

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or

or otherwise prepared, to stimulate the secretory vessels of the kidneys.

But those very extensive glands, which secrete the perspirable matter of the skin and lungs, with the mucus, which lubricates all the internal cells and cavities of the body, claim our particular attention. These glands, as well as all the others, proceed from the capillary vessels which unite the arteries with the veins, and are not properly a part of them ; the mucous and perspirative glands, which arise from the cutaneous and pulmonary capillaries, are associated by direct sympathy ; as appears from immersion in the cold bath, which is therefore attended with a temporary difficult respiration ; while those from the capillaries of the stomach and heart and arteries are more generally associated by reverse sympathy with those of the cutaneous capillaries ; as appears in fevers with weak pulse and indigestion, and at the same time with hot and dry skin.

The disturbed actions of this circle of the associate motions of the secreting system, when the sensorial power of sensation is added to that of irritation, frequently produces inflammation, which consists in the secretion of new fluids or new vessels. Nevertheless, if these disturbed actions be of the torpid kind, the pain, which attends them, is seldom productive of inflammation, as in hemi-crания ; but is liable to excite voluntary actions, and

and thus to expend much sensorial power, as in the shuddering in cold fits of fever, or in convulsions; or lastly the pain itself, which attends torpid actions, is liable to expend or exhaust much sensorial power without producing any increased actions; whence the low pulse, and cold extremities, which usually attend hemicrania; and hence when inert, or inactive sensation attends one link of associated action, the succeeding link is generally rendered torpid, as a coldness of the cheek attends tooth-ach.

5. A fifth important circle of irritative motions is that of the sanguiferous system, in which the capillary vessels are to be included, which unite the arterial and venous systems, both pulmonary and aortal. The disturbed action of this system of the heart and arteries, and capillaries, constitutes simple fever; to which may be added, that the secering and absorbent vessels appending to the capillaries, and the bibulous mouths of the veins, are in some measure at the same time generally affected.

6. Now, though the links of each of these circles of irritative motions are more strictly associated together, yet are they in greater or less degree associated or catenated with each other by direct or reverse sympathy. Thus the

sicknes, or inverted irritative motions of the stomach, are associated or catenated with the disturbed irritative ideas, or sensual motions, in vertigo; as in sea-sicknes. This sicknes of the stomach is also associated or catenated with the torpor of the heart and arteries by direct sympathy, and with the capillaries and absorbents by reverse sympathy; and are thus all of them liable occasionally to be disturbed, when one of them is diseased; and constitute the great variety of the kinds or symptoms of fevers.

VII. *Alternation of the cold and hot Fits.*

1. When any cause occurs, which diminishes to a certain degree the supply of sensorial power in respect to the whole system; as suppose a temporary in exertion of the brain; what happens? First, those motions are exerted with less energy, which are not immediately necessary to life, as the locomotive muscles; and those ideas, which are generally excited by volition; at the same time this deficiency of voluntary motion is different from that which occurs in sleep; as in that the movements of the arterial system are increased in energy though not in frequency. Next, the motions of the alimentary canal become performed with less energy, or cease altogether; and a total want of appetite to solid food occurs, or sicknes, or a diarrhoea occasioned by the indigested

gested aliment. Then the absorbent vessels cease to act with their due energy; whence thirst, and pale urine, though in small quantities. Fourthly, the secreting vessels become affected by the general diminution of sensorial power, whence all the secreted fluids are produced in less quantity. And lastly, the sanguiferous canals feel the general torpor; the pulsations of the heart and arteries become feeble, and consequently quick; and the capillaries of the skin become inactive, acquire less blood from the arteries, and are consequently paler and shrunk.

In this last circumstance of the torpor of the sanguiferous system consists in irritative fever; as all the others are rather accidental or concomitant symptoms, and not essential ones; as fewer or more of them may be present, or may exist with a greater or less degree of inactivity.

2. Now as the capillaries of the skin are exposed to greater varieties of heat and cold, than the heart and arteries, they are supposed to be more mobile, that is, more susceptible of torpor or exertion, or to inflammation, by external stimuli or influences, than the other parts of the sanguiferous system; and as the skin is more sensible to the presence of heat, than the internal parts of the body, the commencement of the cold paroxysms of fever generally either first exists in, or is first perceived by, the coldness and paleness

ness of the skin ; and the commencement of the hot fits by the heat and redness of it.

3. The accumulation of sensorial power occurs in these organs soonest, and in greatest quantity, during their quiescence, which were most perpetually in action during health ; hence those parts of the system soonest recover from torpor in intermittent fever, and soonest fall into the contrary extreme of increased activity ; as the sanguiferous system of the heart and arteries and capillaries. But of these the capillaries seem first to acquire a renovation of their action, as the heat of the skin becomes first renewed, as well as increased beyond its natural quantity, and this in some parts sooner than in others ; which quantity of heat is however not to be estimated simply by the rise of the mercury in the thermometer, but also by the quantity carried away into the atmosphere, or diffused amongst other bodies in a given time ; as more heat passes through water, which boils vehemently, than when it boils gently, though the rise of the thermometer in both cases continues the same. This fact may be known by boiling an egg in water, the white of which coagulates in much less time, if the water boils vehemently, than if it boils moderately, though the sensible heat of the water is the same in both cases.

Another cause, which induces the cutaneous capillaries

capillaries to renew their actions sooner than the heart and arteries after immersion in the cold bath, is, that their torpor was occasioned by defect of irritation: whereas that of the heart and arteries was occasioned by defect of association; which defect of association was owing to the decreased actions of the capillaries, and is now again excited by their renewed action; which excitement must therefore be subsequent to that increased action of the capillaries; and in consequence the increased action of the heart and arteries at the commencement of the hot fit of some fevers is subsequent to the increased action of the cutaneous capillaries. There is, however, in this case an accumulation of the sensorial power of association in the heart and arteries, which must contribute to increase their orgasm in the hot fit, as well as the increased excitement of it by the increased action of the capillaries.

4. Now this increased action of the system, during the hot fit, by exhausting the sensorial powers of irritation and association, contributes to induce a renewal of the cold paroxysm; as the accumulation of those sensorial powers in the cold fit produces the increased actions of the hot fit; which two states of the system reciprocally induce each other by a kind of libration, or a plus and minus, of the sensorial powers of irritation and association.

If the exhaustion of sensorial power during the hot

hot fit of fever only reduces the quantity of irritability and associability to its natural standard, the fever is cured, not being liable to return. If the quantity of these sensorial powers be reduced only so much, as not to produce a second cold fit during the present quantity of external stimuli or influences; yet it may be so far reduced, that a very small subtraction of stimulus, or of influence, may again induce a cold fit; such as the coldness of the night-air, or the diminution of solar or lunar gravitation, as in intermittent fevers.

5. Another cause of the renovation of the cold fits of fever is from some parts of the system not having completely recovered from the former cold paroxysm; as happens to the spleen, liver, or other internal viscus; which sometimes remains tumid, and either occasions a return of the cold fit by direct sympathy with other parts of the body, or by its own want of action causes a diminution of the general quantity of heat, and thus facilitates the renovation of the torpor of the whole system, and gives cause to intermittent fevers catenated with lunar or solar influence.

VIII. *Orgasm of the Capillaries.*

As the remaining torpor of some less essential part of the system, as of the spleen, when the hot fit ceases, produces after one, two, or three days a return of cold fit by direct sympathy with the cutaneous

cutaneous capillaries, when joined with some other cause of torpor, as the defect of solar or lunar influences, or the exposure to cold or hunger, and thus gives origin to intermittent fever; so the remaining torpor of some more essential parts of the system, as of the stomach and intestines, is probably the cause of the immediate recurrence of the cold paroxysm, at the time the hot one ceases, by their direct sympathy with the cutaneous capillaries, without the assistance of any other cause of torpor; and thus produces remittent fever. And lastly the remaining torpor of some still more essential parts of the system, as the heart and arteries, after the hot fit ought to cease, is liable by reverse sympathy with the cutaneous capillaries to continue their orgasm, and thus to render a fever continual, which would otherwise remit or intermit.

Many difficulties here occur, which we shall endeavour to throw some light upon, and leave to future investigation; observing only that difficulties were to be expected, otherwise fevers would long since have been understood, as they have employed the unremitting attention of the physicians of all ages of the world.

1: Why do the same parts of successive trains of action sometimes affect each other by direct, and sometimes by reverse sympathy? — 1st, When any irritative motion ceases, or becomes torpid, which:

was before in perpetual action ; it is either deprived of its usual stimulus, and thence the sensorial power of irritation is not excited ; or it has been previously too much stimulated, and the sensorial power has been thus exhausted.

In the former case an accumulation of sensorial power soon occurs, which is excitable by a renewal of the stimulus ; as when the fingers, which have been immersed some time in snow, are again exposed to the usual warmth of a room. Or, secondly, the sensorial power of irritation becomes so much accumulated, that the motions, which were torpid, are now performed by less stimulus than natural ; as appears by the warmth, which soon occurs after the first chill in going into frosty air, or into the bath at Buxton, which is about eighty degrees of heat. Or, lastly, this accumulation of the sensorial power of irritation so far abounds, that it increases the action of the next link of the associated train or tribe of motions ; thus on exposing the skin to cold air, as in walking out in a frosty morning, the actions of the stomach are increased, and digestion strengthened.

But where the torpor of some irritative motion is owing to the previous exhaustion of the sensorial power of irritation by too great stimulus, the restoration of it occurs either not at all, or much more slowly than in the former instances ; thus after intoxication the stomach is very slow in

in recovering its due quantity of the sensorial power of irritation, and never shews any accumulation of it.

2. When an associate motion, as described in the introduction to Class IV. 1. 1. acts with less energy, the sensorial power of association is either not sufficiently excited by the preceding fibrous motions; or it has been expended or exhausted by the too violent actions of the preceding fibrous motions. In the former case there occurs an accumulation of the sensorial power of association; exactly as, where the usual stimulus is withdrawn, there occurs an accumulation of the sensorial power of irritation. Thus when the actions of the capillaries of the skin are diminished by immersion in cold water, the capillaries of the lungs are rendered torpid by the want of the excitement of the sensorial power of association, owing to the lessened actions of the previous fibrous motions, namely, of those of the skin. Nevertheless as soon as the capillaries of the skin regain their increased activity by the accumulation of the sensorial power of irritation, these capillaries of the lungs act with greater energy also owing to their accumulated sensorial power of association. These are instances of direct sympathy, and constitute the cold and hot paroxysms of intermittent fever; or the first paroxysm of a continued one.

3. When

3. When the first link of a train of associated motions, which is subject to perpetual action, becomes a considerable time torpid for want of being excited by the previous exertions of the irritative motions, with which it is catenated ; the sensorial power of association becomes accumulated in so great a degree as to affect the second link of the train of associated motions, and to excite it into stronger action. Thus when the stomach is rendered torpid by contagious matter swallowed into it mixed with the saliva, the heart and arteries act more feebly ; because the sensorial power of association, which used to be excited by the fibrous motions of the stomach, is not now excited ; and in consequence the motions of the heart and arteries act only by the sensorial power of irritation, which is excited by the stimulus of the blood.

But during this torpor of the stomach, and less action of the heart and arteries, so great an accumulation of the sensorial powers of irritation and of association occurs, that it adds to the action of the next link of this vital circle of actions, that is, to that of the cutaneous capillaries. Whence in this situation the torpor of the stomach occasions a diminished action of the heart and arteries by direct sympathy, and may be said to occasion an increased one of the cutaneous capillaries by reverse sympathy ; which constitute continued fever with weak pulse.

Nor

Nor is this increased action of the capillaries in consequence of the decreased action of the heart and arteries, as in fevers with weak pulse, a single fact in the animal economy; though it exists in this case in the greatest degree or duration, because the heart and arteries are perpetually in greater action than any other part of the system. But a similar circumstance occurs, when the stomach is rendered inactive by defective excitement of the sensorial power of association, as in sea-sickness, or in nephritis. In these cases the sensorial power of association becomes much accumulated in the stomach, and seems by its superabundance to excite the absorbent system, which is so nearly connected with it, into great increase of action; as is known by the great quantity frequently in these situations rejected by vomit, which could not otherways be supplied. It is probable the increase of digestion by walking in frosty air, with many other animal facts, may by future observations be found to be dependent on this principle, as well as the increased action of the capillaries in continued fevers with weak pulse.

Whereas in continued fever with strong pulse, which may perhaps occur sometimes on the first day even of the plague, the stomach with the heart and arteries and the capillaries act by direct sympathy; that is, the stomach is excited into stronger action by increased irritation owing to

the stimulus of contagious matter; these stronger irritative motions of the stomach excite a greater quantity of the sensorial power of association, which then actuates the heart and arteries with greater energy, as these are catenated with the stomach; and in the same manner the increased actions of the heart and arteries excite a greater quantity of the sensorial power of association, which actuates the cutaneous capillaries with increase of energy. See Clas IV. 1. 1.

4. I shall dwell a little longer on this intricate subject. The commencement of fever-fits is known by the inactivity of the cutaneous capillaries, which inactivity is observable by the paleness and coldness of the skin, and also by the pain of coldness, which attends it. There is nevertheless in most cases, except those which are owing to exposure to external cold, a torpor of the capillaries of some internal viscus preceding this inactivity of the cutaneous capillaries; which is known by the tumour or hardness of the viscus, or by an aching pain of it. The capillaries of the lungs are at the same time rendered inactive or torpid, as appears by the difficulty of breathing, and coldness of the breath in cold fits of fever, and in going into the cold bath; but the lungs are not affected with the pain either of coldness or of torpor.

One cause of this synchronous or successive inactivity

activity of the cutaneous capillaries, in consequence of the previous torpor of some internal viscus, may be owing to the deficiency of heat; which must occur, when any part becomes inactive; because the secretions of that part cease or are lessened, and the quantity of heat of it in consequence. But the principal cause of it I suppose to be owing to the defect of the sensorial power of association; which power of association is excited by some previous or concomitant motions of the parts of every great circle of actions. This appears on going into the cold bath, because the shortness of breath instantly occurs, sooner than one can conceive the diminution of the heat of the skin could affect the lungs by the want of its stimulus; but not sooner than the defect of the sensorial power of association could affect them; because this must cease to be excited into action on the instant that the cutaneous capillaries cease to act; whence in the first moment of contact of the cold water the cutaneous capillaries cease to act from defect of irritation; which is caused by defect of the stimulus of heat; and in the second moment the capillaries of the lungs cease to act from the defect of association; which is caused by the defect of the motions of the cutaneous capillaries. Thus the universal torpor in the cold paroxysm of fever is an example of direct sympathy, though occasioned in part by de-

fect of irritation, and in part by defect of association.

5. Thus in walking out in a frosty morning the skin is cooled by the contact of the cold air, whence the actions of its capillaries are diminished for want of their usual stimulus of heat to excite a sufficient quantity of the sensorial power of irritation. Hence there is at first a saving of the sensorial power of irritation for the purpose of actuating the other parts of the system with greater energy. Secondly, the sensorial power of association, which used to be excited by the motions of the cutaneous capillaries, is now not so powerfully excited; and in consequence the parts, which constitute the next links of the circles of associated motions, are for a time actuated with less energy, and a temporary general chillness succeeds; which is so far similar to the cold fit of intermittent fever.

In this situation there is a curious circumstance occurs, which merits peculiar attention: after a short time, though the external skin continues cool by its exposure to the cold air, and the actions of its capillaries are consequently diminished, yet the capillaries of the stomach act with greater energy; as is known by increased digestion and consequent hunger. This is to be ascribed to the accumulation of the sensorial power of irritation, which now excites by its superabundance,

abundance, or overflowing, as it were, the stomach into increased action; though it is at the same time excited less powerfully than usual by the sensorial power of association. Thus the accumulation of the sensorial power of irritation in the vessels of the skin increases in this case the action of the stomach, in the same manner as an accumulation of the sensorial power of association in the heart and arteries in fevers with weak pulse increases the action of the capillaries.

If nevertheless the coldness of the skin be too long continued, or exists in too great a degree, so as in some measure to impair the life of the part, no further accumulation of the sensorial power of irritation occurs; and in consequence the actions of the stomach become less than natural by the defect of the sensorial power of association; which has ceased to be excited by the want of action of the cutaneous capillaries. Whence continued coldness of the feet is accompanied with indigestion and heartburn. See Class IV. 2. 1. 6.

6. Similar to this when the actions of the stomach are rendered torpid by the previous stimulus of a violent emetic, and its motions become retrograde in consequence, a great quantity of sensorial power is exerted on the lymphatics of the lungs, and other parts of the body; which excites them into greater direct action, as is evinced by the exhibition of digitalis in anasarca. In this

situation I suppose the emetic drug stimulates the muscular fibres of the stomach into too great action; and that in consequence a great torpor soon succeeds; and that this inaction of the muscular parts of the stomach is not followed by much accumulation of the sensorial power of irritation; because that sensorial power is in great measure exhausted by the previous excessive stimulus. But the lymphatics of the stomach have their actions lessened by defect of the sensorial power of association, which is not now excited into action, owing to the lessened motions of the muscular parts of it, with which the lymphatics are associated. The sensorial power of association becomes therefore accumulated in these lymphatics of the stomach, because it is not excited into action; exactly as the power of irritation becomes accumulated in the hand, when immersed in snow; and this accumulated, sensorial power of association excites the lymphatics of the lungs and of other parts, which are most nearly associated with those of the stomach, into more energetic actions. Thus the muscular fibres of the stomach act with the lymphatics of that organ in direct sympathy; and the lymphatics of the stomach act in reverse sympathy with those of the lungs and of other parts of the body; the former of which is caused by defect of the excitement of the sensorial power of association, and the latter by the accumulation of it.

Besides the efficient cause, as above explained,
the

the final cause, or convenience, of these organic actions are worthy our attention. In this case of an acrid drug swallowed into the stomach the reverted actions of the muscular fibres of the stomach tend to eject its enemy; the reverted actions of its lymphatics pour a great quantity of fluids into the stomach for the purpose of diluting or washing off the noxious drug; and the increased actions of the other lymphatics supply these retrograde ones of the stomach with an inconceivable supply of fluids, as is seen in Ileus and Cholera.

7. The inquisitive reader will excuse my continuing this subject, though perhaps with some repetitions, as it envelopes the very essence of fever. When the first link of a train of actions is excited by excessive stimulus, or excessive irritability, and thus acts with unusual energy by the increased quantity of irritation, these increased motions excite a greater quantity of the sensorial power of association, which causes increased motions in the second link, which is catenated with the first; and then the excessive action of this second link excites also a greater quantity of the sensorial power of association, which increases the motions of the third link of this chain of association, and thus the increase of the stimulus on the irritative motions, to which the chain of

B b 4 association

situation I suppose the emetic ~~the action of~~ muscular fibres of the stomach, ~~the action of~~ associated motions. and that in certain parts of the stomach, ~~the action of~~ associated motions become torpid; and that in certain parts of the stomach, ~~the action of~~ the sensorial power of irritation succeeds; and that the power of association also cumulation of ~~the action of~~ both because it has been in because that ~~the action of~~ great action, and is now exhausted. But the ~~the action of~~ ~~the lessened action of the irritation which used to excite it.~~ These are asso- ~~the cold and hot fit of intermittents.~~ ov. ~~But though the accumulation of the sensorial power of irritation during the quiescence of some motion owing to want of stimulus generally induces torpor in the first link of the train of associated motions catenated with it; as the capillaries of the lungs become torpid immediately on immersion of the skin into cold water; yet in some situations an orgasm or excess of action is produced in the first link of the associated motions thus catenated with irritative ones; as in the increased action of the stomach, when the skin is for a time exposed to cold air; which may in part be ascribed to the general increase of action of the whole system, owing to the diminished expenditure of sensorial power, but particularly of the parts, which have habitually acted together; as when one arm is paralytic the other is liable to more frequent or almost continual motion;~~

tion; and when one eye becomes blind the other frequently becomes stronger; which is well known to farriers, who are said sometimes to destroy the sight of one eye to strengthen that of the other in diseased horses.

Hence there is sometimes a direct sympathy, and sometimes a reverse one succeeds the torpor occasioned by defect of stimulus, the latter of which is perhaps owing to a certain time being required for the production of an accumulation of the sensorial power of irritation by the nervous branches of the torpid organ; which accumulation is now in part or entirely derived to the next link of the association. Thus in going into a coldish bath, as into a river in the summer months, we at first experience a difficulty of breathing from the torpid action of the pulmonary capillaries, owing to the deficient excitement of the sensorial power of association in consequence of the torpor of the cutaneous capillaries. But in a very short time, as in one minute, the sensorial power of irritation becomes accumulated by the inactivity of the cutaneous capillaries; and as its superabundance becomes now expended on the pulmonary capillaries, the difficult respiration ceases; though the cutaneous capillaries continue torpid by their contact with the cold water, and consequently the sensorial power of association, which used to contribute to actuate the pulmonary capillaries, is less excited.

8. In

8. In like manner when there exists an accumulation of the sensorial power of association, owing to defect of its excitement by some previous irritative or associate motions, it is generally accompanied for a certain time by a torpor not only of the link first affected, but of the subsequent parts, or of the whole train of associated motions, as in the cold fits of intermittent fevers. Yet after a time an increased action of the next links of associated motions succeeds the torpor of the first, as the absorbent vessels of the lungs act more violently in consequence of the deficient action of those of the stomach; and the skin at the commencement of sickness is pale and cold, but in a little time becomes flushed and warm.

Thus we see in associate motions, which are rendered torpid by defect of excitement, that sometimes a direct, and sometimes a reverse sympathy succeeds in the subsequent links of the chain. But I believe where a torpor of irritative or of the associate motions is caused by a previous too great expenditure or exhaustion of the sensorial powers of irritation or association, no increase of action in the subsequent link ever occurs, or not till after a very long time.

Thus when the stomach becomes torpid by previous violent exertion, and consequent exhaustion of the sensorial power of irritation, as after intoxication with wine or opium, or after the exhibition of some violent emetic drug, the torpor is communicated

municated to the heart and arteries, as in continued fevers with weak pulse. But where the torpor of the stomach is produced from defective association, as in sea-sickness ; or in the sickness which occurs, when a stone stimulates the ureter ; no torpor is then communicated to the heart and arteries. For in the former case there is no accumulation of sensorial power in the stomach, which was previously exhausted by too great stimulus ; but in the latter case the accumulation of sensorial power in the stomach during its torpor is evinced by this circumstance ; that in sea-sickness the patients eat and drink voraciously at intervals ; and the pulse is generally not affected by the sickness occasioned by a stone in the ureter. For the action of the stomach is then lessened, and in consequence becomes retrograde, not owing to the exhaustion of the sensorial power of irritation, but to the want of excitement of the sensorial power of association ; which is caused by the defective action of the ureter, which becomes occasionally torpid by the great stimulus of the stone it contains ; or which is caused by the great exhaustion of sensorial power by the pain ; which affects the ureter without exciting inflammation, or increased action of it.

9. Thus though the stomach after the great stimulus of intoxication from excess of wine or opium will continue many hours without accumulation

mulation of sensorial power, as appears from the patient's experiencing no appetite at the intervals of sickness; yet after long abstinence from food, at length not only the exhausted quantity of sensorial power is renewed, but an accumulation of it at length occurs, and hunger returns. In this situation the stomach is generally about a whole day before it regains its usual powers of digestion; but if it has been still more violently stimulated, and its actions further impaired, a still more permanent torpor along with a continued fever with weak pulse is liable to occur; and a fourth part, or a half, or three-fourths, or a whole lunar period passes, before it recovers its due irritability and consequent action.

In similar manner, after a person has been confined in a very warm room for some hours, the cutaneous capillaries, with their secretory and absorbent vessels, become exhausted of their sensorial power of irritation by the too great violent exertions occasioned by the unusual stimulus of heat; and in coming into a colder atmosphere an inactivity of the cutaneous vessels exists at first for some time without accumulation of sensorial power; as is shewn by the continuance of the pain of cold and the paleness; but after a time both the pain of cold and paleness vanish, which now indicates an accumulation of the sensorial power of irritation, as less degrees of heat stimulate the system into due action.

In

In the same manner, after any one has been some time in the summer funshine, on coming into a dark cell he continues much longer before he can clearly distinguish objects, than if his eyes had only been previously exposed to the light of a cloudy day in winter; because the sensorial power of irritation, and consequent sensation, had in the first case been previously much expended or exhausted; and therefore required a much longer time before it could be produced in the brain, or derived to the optic nerves, in such quantity as to restore the deficiency, and to cause an accumulation of it; whereas in the latter case no deficiency had occurred.

10. Thus the accumulation or deficiency of sensorial power in a torpid organ, which had previously been accustomed to perpetual action, depends on the manner in which it becomes torpid; that is, whether by great previous stimulus, or great previous excitement of the power of association; or by defect of its accustomed stimulus, or of its accustomed excitement of the power of association. In the former case the sensorial power is in an exhausted state, and therefore is not likely to become so soon accumulated, as after drunkenness, or exposure to great heat, or to great light; in the latter a great accumulation of sensorial power occurs, as after exposure to cold, or hunger, or darkness.

Hence when the stomach continues torpid by previous violent stimulus, as in the exhibition of digitalis, no accumulation of sensorial power of irritation supervenes; and in consequence the motions of the heart and arteries, which are associated with those of the stomach, become weak, and slow, and intermittent, from the defect of the excitement of the sensorial power of association. But what follows? as the actions of the heart and arteries are lessened by the deficient action of the sensorial power of association, and not by previous increased excitement of it; a great accumulation of the sensorial power of association occurs, which is exerted on the pulmonary and cutaneous absorbents by reverse sympathy, and produces a great absorption of the fluid effused into the cellular membrane in anaesthesia, with dry skin; constituting one kind of atrophy.

But if at the same time the secerning vessels of the stomach are stimulated into so violent activity as to induce great consequent torpor, as probably happens when contagious matter is swallowed into the stomach with our saliva, those of the heart and arteries act feebly from the deficient excitement of the power of association; and then the cutaneous and pulmonary secerning vessels act with greater force than natural, owing to the accumulation of the sensorial power of association; and unnatural heat of the skin, and of the breath succeed;

succeed; but without frequency of pulse, constituting the paresis irritativa of Class I. 2. 1. 2. And lastly, if a paucity of blood attends this paresis, or some other cause inducing a frequency of pulse, the febris inirritativa, or fever with weak pulse, is produced.

But on the contrary when the stomach has previously been rendered torpid by defect of stimulus, as by hunger, if food be too hastily supplied, not only great exertion of the stomach itself succeeds, but fever with strong pulse is induced in consequence; that is, the heart and arteries are excited into more energetic action by the excess of the power of association, which catenates their motions with those of the stomach. For the redundancy of sensorial power of irritation, which was accumulated during the inactivity of the stomach, and is now called into action by stimulus, actuates that organ with increased energy, and excites by these increased motions the sensorial power of association; which has also been accumulated during the inactivity of the heart and arteries; and thus these organs also are now excited into greater action.

So after the skin has been exposed some hours to greater heat than natural in the warm room, other parts, as the membranes of the nostrils, or of the lungs, or of the stomach, are liable to become torpid from direct sympathy with it, when we come into air of a moderate temperature;

whence

whence catarrhs, coughs, and fevers. But if this torpor be occasioned by defect of stimulus, as after being exposed to frosty air, the accumulation of sensorial power is exerted, and a glow of the skin follows, with increased digestion, full respiration, and more vigorous circulation.

11. It may be asked, Why is there a great and constant accumulation of the sensorial power of association, owing to the torpor of the stomach and heart and arteries, in continued fever with weak pulse; which is exerted on the cutaneous and pulmonary capillaries, so as to excite them into increased action for many weeks, and yet no such exuberance of sensorial power produces fever in winter-sleeping animals, or in chlorosis, or apergia, or hysteria?

In winter-sleeping animals I suppose the whole nervous system is torpid, or paralysed, as in the sleep of frozen people; and that the stomach is torpid in consequence of the inactivity or quiescence of the brain; and that all other parts of the body, and the cutaneous capillaries with the rest, labour under a similar torpor.

In chlorosis, I imagine, the actions of the heart and arteries, as well as those of the cutaneous and pulmonary capillaries, suffer along with those of the stomach from the deficient stimulus of the pale blood; and that though the liver is probably the seat of the original torpor in this disease, with

which

which all other parts sympathize from defect of the excitation of the sensorial power of association; yet as this torpor occurs in so small a degree as not to excite a shuddering or cold fit, no observable consequences are in general occasioned by the consequent accumulation of sensorial power. Sometimes indeed in chlorosis there does occur a frequent pulse and hot skin; in which circumstances I suppose the heart and arteries are become in some degree torpid by direct sympathy with the torpid liver; and that hence not only the pulse becomes frequent, but the capillaries of the skin act more violently by reverse sympathy with the heart and arteries, owing to the accumulation of the sensorial power of association in them during their torpid state, as occurs in irritative fever. See Article 11 of this Supplement.

In apergia chronica the actions of the stomach are not so far impaired or destroyed as totally to prevent the excitation of the sensorial power of association, which therefore contributes something towards the actions of the heart and arteries, though less than natural, as a weak pulse always I believe attends this disease.

There is a torpor of the stomach, and of the upper part of the alimentary canal in hysteria, as is evident from the retrograde actions of the duodenum, stomach, and oesophagus, which constitute the globus hystericus, or sensation of a globe rising into the throat. But as these retrograde actions

are, less than those, which induce sickness or vomiting, and are not occasioned by previous exhaustion of the sensorial power of irritation, they do not so totally prevent the excitement of the sensorial power of association, as to lessen the motion of the heart and arteries so much as to induce fever; yet in this case, as in apergia, and in chlorosis, the pulsations of the heart and arteries are weaker than natural, and are sometimes attended with occasionally increased action of the capillaries; as appears from the flushings of the face, and hot skin, which generally form an evening febricula in diseases attended with weak digestion.

12. The increased action, or orgasm, of the cutaneous, pulmonary, and cellular capillaries, with their secering and absorbent vessels, in those fevers which are attended with deficiency of vital action, exhausts the patient both by the additional expenditure of sensorial power on those organs of secretion, and by the too great absorption of the mucus and fat of the body; whence great debility and great emaciation. Hence one great indication of cure of continued fever with arterial debility is to diminish the too great action of the capillaries; which is to be done by frequent ablutions, or bathing the whole skin in tepid or in cold water, as recommended by Dr. Currie of Liverpool (Philos. Trans. for 1792), for half

half an hour, twice a day, or at those times when the skin feels dryest and hottest. Much cool air should also be admitted, when the breath of the patient feels hot to one's hand; or when the tongue, especially its middle part, is dry, and covered with a crust of indurated mucus; as these indicate the increased action of the pulmonary capillaries; in the same manner as the dry and hot skin indicates the orgasm of the cutaneous capillaries; and the emaciation of the body that of the cellular ones.

For this purpose of abating the action of the capillaries by frequent ablution or fomentation, water of any degree of heat beneath that of the body will be of service, and ought in accurate language to be called a cold bath; but the degree of coldness, where the patient is sensible, should in some measure be governed by his sensations; as it is probable, that the degree of coldness, which is most grateful to him, will also be of the greatest benefit to him. See Class III. 2. 1. 12. and Article 15 of this Supplement.

Another great use of frequent ablutions, or fomentations, or baths, in fevers, where the stomach is in some degree torpid, is to supply the system with aqueous fluid by means of the cutaneous absorbents; which is dissipated faster by the increased action of the secerning capillaries, than the stomach can furnish, and occasions great thirst at the intervals of the sickness.

IX. *Torpor of the Lungs.*

1. The lungs in many cases of contagion may first be affected with torpor, and the skin become cold by sympathy; in the same manner as a cold skin on going into the cold bath induces difficulty of breathing. Or the stomach may become affected with torpor by its sympathy with the lungs, as in the experiments of Mr. Watt with hydrocarbonate gas; a few respirations of which induced sickness, and even syncope. When the stomach or skin is thus affected secondarily by association, an accumulation of sensorial power occurs much sooner, than when these parts become torpid in consequence of previous excess of stimulus; and hence they sooner recover their accustomed action, and the fever ceases. The particles of contagious matter thus received by respiration somewhat resemble in their effects the acid gases from burning sulphur, or from charcoal; which, if they do not instantly destroy, induce a fever, and the patient slowly recovers.

2. I was some years ago stooping down to look, which way the water oozed from a morass, as a labourer opened it with a spade, to detect the source of the spring, and inhaled a vapour, which occasioned an instant sense of suffocation. Immediately

mediately recoiling I believe I inhaled it but once; yet a few hours afterwards in the cool of the evening, when I returned home rather fatigued and hungry, a shivering and cold fit occurred, which was followed by a hot one; and the whole disease began and terminated in about twelve hours without return. In this case the power of fear, or of imagination, was not concerned; as I neither thought of the bad air of a morsair before I perceived it; nor expected a fever-fit, till it occurred.

- In this case the torpor commenced in the lungs, and after a few hours, by the addition of fatigue, and cold, and hunger, was propagated by direct sympathy to the rest of the system. An orgasm or increased action of the whole system was then induced by the accumulation of sensorial power of irritation in the lungs, and of association in the other organs; and when these subsided, the disease ceased. It may be asked, could a torpor of the capillaries of the air-vessels of the lungs be so suddenly produced by great stimulation? — It appears probable, that it might, because great exertion of irritative motions may be instantly produced without our perceiving them; that is, without their being attended by sensation, both in the lungs and stomach; and the organs may become torpid by the great expenditure of the sensorial power of irritation in an instant of time;

as paralysis frequently instantly follows too great an exertion of voluntary power.

8. When the capillaries of the lungs act too violently, as in some continued fevers; which is known by the heat of the breath, and by the dryness of the tongue, especially of the middle part of it; not only cooler air might be admitted more freely into a sick room to counteract this orgasm of the pulmonary capillaries; but perhaps the patient might breathe with advantage a mixture of carbonic acid gas, or of hydrogene gas, or of azote with atmospheric air. And on the contrary, when there exists an evident torpor of the pulmonary capillaries, which may be known by the correspondent chilness of the skin; and by a tickling cough, which sometimes attends cold paroxysms of fever, and is then owing to the deficient absorption of the pulmonary mucus, the saline parts of which stimulate the bronchiæ, or air-vessels; a mixture of one part of oxygen gas with 10 or 20 parts of atmospheric air might probably be breathed with great advantage.

X. *Torpor of the Brain.*

As the inactivity or torpor of the absorbent vessels of the brain is the cause of hydrocephalus internus; and as the deficiency of venous absorption

absorption in the brain, or torpor of the extremities of its veins, is believed frequently to be the cause of apoplexies; so there is reason to conclude, that the torpor of the secerning vessels of the brain, which are supposed to produce the sensorial power, may constitute the immediate cause of some fevers with arterial debility. And also that the increased action of these secerning vessels may sometimes constitute the immediate cause of fevers with arterial strength.

It is nevertheless probable, that the torpor or orgasm of the sanguiferous, absorbent, or secerning vessels of the brain, may frequently exist as a secondary effect, owing to their association with other organs, as the stomach or lungs; and may thus be produced like the torpor of the heart and arteries in inirritative fevers, or like the orgasm of those organs in irritative fevers, or inflammatory ones.

Where there exists a torpor of the brain, might not very slight electric shocks passed frequently through it in all directions be used with advantage? Might not fomentations of 94 or 96 degrees of heat on the head for an hour at a time, and frequently repeated, stimulate the brain into action; as in the revival of winter-sleeping animals by warmth? Ether externally might be frequently applied, and a blister on the shaved head.

Where the secerning vessels of the brain act

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with

with too great energy, as in some inflammatory fevers, might it not be diminished by laying the patient horizontally on a mill-stone, and whirling him, till sleep should be produced, as the brain becomes compressed by the centrifugal force? See Article 15 of this Supplement.

XI. *Torpor of the Heart and Arteries.*

1. It was shewn in Class IV. 1. 1. 6. in IV. 2. 1. 2. and in Suppl. I. 6. 3. that a reverse sympathy generally exists between the lacteal and lymphatic branches of the absorbent system. Hence, when the motions of the absorbents of the stomach are rendered torpid or retrograde in fevers with arterial debility, those of the skin, lungs, and cellular membrane, act with increased energy. But the actions of the muscular fibres of the heart and arteries are at the same time associated with those of the muscular fibres of the stomach by direct sympathy. Both these actions occur during the operation of powerful emetics, as squill, or digitalis; while the motions of the stomach continue torpid or retrograde, the cellular and cutaneous absorbents act with greater energy, and the pulsations of the heart and arteries become weaker, and sometimes slower.

2. The increased action of the stomach after a meal,

meal, and of the heart and arteries at the same time from the stimulus of the new supply of chyle, seems originally to have produced, and to have established, this direct sympathy between them. As the increased action of the absorbents of the stomach after a meal has been usually attended with diminished action of the other branches of the absorbent system, as mentioned in Class IV. 1. 1. 6. and has thus established a reverse sympathy between them.

2. Besides the reverse sympathy of the absorbent vessels and the muscles of the stomach, and of the heart and arteries, with those of the skin, lungs, and cellular membrane; there exists a similar reverse sympathy between the secreting vessels or glands of the former of these organs with those of the latter; that is the mucous glands of the heart and arteries act generally by direct sympathy with those of the stomach; and the mucous glands of the cellular membrane of the lungs, and of the skin, act by reverse sympathy with them both.

Hence when the stomach is torpid, as in sickness, this torpor sometimes only affects the absorbent vessels of it; and then the absorbents of the cellular membrane and the skin only act with increased energy by reverse sympathy. If the torpor affects the muscular fibres of the stomach, those of the heart and arteries act by direct sympathy.

pathy with it, and a weak pulse is produced, as in the exhibition of digitalis, but without increase of heat. But if the torpor also affects the glands of the stomach, the cutaneous and pulmonary glands act with greater energy by their reverse sympathy with those of the stomach, and of the heart and arteries; and great heat is produced along with increased perspiration both from the skin and lungs.

3. There is some difficulty in explaining, why the actions of the extensive system of capillary glands, which exist on every other membrane and cell in the body for the purpose of secreting mucus and perspirable matter, should so generally act by reverse sympathy with those of the stomach and upper part of the intestines. It was shewn in Class IV. 1. 1. 6. that when the stomach was filled with solid and fluid aliment, the absorbents of the cellular membrane, and of the bladder, and of the skin, acted with less energy; as the fluids, they were used to absorb and transmit into the circulation, were now less wanted; and that hence by habit a reverse sympathy obtained between these branches of the absorbents of the alimentary canal, and those of the other parts of the body.

Now, as at this time less fluid was absorbed by the cutaneous and cellular lymphatics, it would happen, that less would be secreted by their correspondent

respondent secreting vessels, or capillary glands; and that hence by habit, these secreting vessels would acquire a reverse sympathy of action with the secreting vessels of the alimentary canal.

Thus when the absorption of the tears by the puncta lacrymalia is much increased by the stimulus of snuff; or of an affecting idea, on the nasal ducts, as explained in Sect. XVI. 8. 2. a great increase of the secretion of tears from the lacrymal glands is produced by the direct sympathy of the action of these glands with those of their correspondent absorbents; and that though in this case they are placed at so great a distance from each other,

4. A difficult question here occurs; why does it happen, that in fevers with weak pulse the contractions of the heart and arteries become at the same time more frequent; which also sometimes occurs in chlorosis, and in some hysterical and hypochondriac diseases, and in some insanities; yet at other times the weak pulse becomes at the same time slow, as in the exhibition of digitalis, and in paresis irritativa, described in Class I. 2. 1. 2. which may be termed a fever with slow pulse? this frequency of pulse can not depend on heat, because it sometimes exists without heat, as towards the end of some fevers with debility.

Now as apoplexies, which are sometimes ascribed to fulness of blood, are attended with slow

slow pulse; and as in animals dying in the slaughter-house from deficiency of blood the pulse becomes frequent in extreme; may not the frequency of pulse in fevers with arterial debility be in general owing to paucity of blood? as explained in Sect. XXXII. 2. 3. and its slowness in paresis irritativa be caused by the debility being accompanied with due quantity of blood? or may not the former circumstance sometimes depend on a concomitant affection of the brain approaching to sleep? or to the unusual facility of the passage of the blood through the pulmonary and aortal capillaries? in which circumstance the heart may completely empty itself at each pulsation, though its contractions may be weak. While the latter depends on the difficulty of the passage of the blood through the pulmonary or aortal capillaries, as in the cold fits of intermittents, and in some palpitations of the heart, and in some kinds of hæmoptoe; in these cases the increased resistance prevents the heart from emptying itself, and in consequence a new diastole sooner occurs, and thus the number of pulsations becomes greater in a given time.

5. In respect to the sympathies of action, which produce or constitute fever with debility, the system may be divided into certain provinces, which are afferent or opposite to each other. First, the lacteals or absorbent vessels of the

stomach, and upper part of the intestines; secondly, the lymphatics or all the other branches of the absorbent vessels, which arise from the skin, mucous membranes, cellular membranes, and the various glands. These two divisions act by reverse sympathy with each other in the hot fits of fever with debility, though by direct sympathy in the cold ones. The third division consists of the secreting vessels of the stomach and upper intestines; and the fourth of the secreting vessels of all the other parts of the body, as the capillary glands of the skin, lungs, and cellular membrane, and the various other glands belonging to the sanguiferous system. Many of these frequently, but the capillaries always, act by reverse sympathy with those of the third division above mentioned in the hot fits of fever with debility, though by direct sympathy with them in the cold fits. Fifthly, the muscular fibres of the stomach, and upper intestines; and sixthly, the muscular fibres of the heart and arteries. The actions of these two last divisions of moving fibres act by direct sympathy with each other, both in the cold and hot fits of fevers with debility.

The efficient cause of those apparent sympathies in fevers with weak pulse may be thus understood. In the cold paroxysm of fever with weak pulse the part first affected I believe to be the stomach, and that it has become torpid by previous violent exertion, as by swallowing contagious

tagious matter mixed with saliva, and not by defect of stimulus, as from cold or hunger. The actions of this important organ, which sympathizes with almost every part of the body, being thus much diminished or nearly destroyed, the sensorial power of association is not excited; which in health contributes to move the heart and arteries, and all the rest of the system; whence an universal torpor occurs.

When the hot fit approaches, the stomach in fevers with strong pulse regains its activity by the accumulation of the sensorial power either of irritation, if it was the part first affected, or of association if it was affected in sympathy with some other torpid part, as the spleen or liver; which accumulation is produced during its torpor. At the same time all the other parts of the system acquire greater energy of action by the accumulation of the sensorial power of association, which was produced, during their inactivity in the cold fit.

But in fevers with weak pulse the stomach, in which the sensorial power of irritation had been previously exhausted by violent action, acquires no such quick accumulation of sensorial power, but remains in a state of torpor after the hot fit commences. The heart and arteries remain also in a state of torpor, because there continues to be no excitement of their power of association owing to the torpid motions of the stomach; but hence

it

it happens, that there exists at this time a great accumulation of the power of association in the less active fibres of the heart and arteries ; which, as it is not excited and expended by them, increases the associability of the next link of the associated chain of motions, which consists of the capillaries or other glands ; and that in so great a degree as to actuate them with unnatural energy, and thus to produce a perpetual hot fit of fever. Because the associability of the capillaries is so much increased by the accumulation of this power, owing to the lessened activity of the heart and arteries, as to over-balance the lessened excitement of it by the weaker movements of the heart and arteries.

6. When the accumulation of the sensorial power of irritation caused by defect of stimulus is greater in the first link of a train of actions, to which associated motions are catenated, than the deficiency of the excitement of the sensorial power of association in the next link, what happens ? — the superabundance of the unemployed sensorial power of the first link is derived to the second ; the associability of which thus becomes so greatly increased, that it acts more violently than natural, though the excitement of its power of association by the lessened action of the first link is less than natural. So that in this situation the withdrawing of an accustomed stimulus in some parts

parts of the system will decrease the irritative motions of that part, and at the same time occasion an increase of the associate motion of another part, which is catenated with it.

This circumstance nevertheless can only occur in those parts of the system, whose natural actions are perpetual, and the accumulation of sensorial power on that account very great, when their activity is much lessened by the deduction of their usual stimulus; and are therefore only to be found in the sanguiferous system, or in the alimentary canal, or in the glands and capillaries. Of the first of which the following is an instance.

The respiration of a reduced atmosphere, that is of air mixed with hydrogene or azote, quickens the pulse, as observed in the case of Mrs. Eaton by Dr. Reynolds and Dr. Thornton; to which Dr. Beddoes adds in a note, that "he never saw an instance in which a lowered atmosphere did not at the moment quicken the pulse, while it weakened the action of the heart and arteries." Considerations on Factitious Airs, by Thomas Beddoes and James Watt, Part III. p. 67. Johnson, London. By the assistance of this new fact the curious circumstance of the quick production of warmth of the skin on covering the head under the bed-clothes, which every one must at some time have experienced, receives a more satisfactory explanation, than that which is given in Class IV. 1. 1. 2. which was printed before this part

part of Dr. Beddoes's Considerations was published.

For if the blood be deprived of its accustomed quantity of oxygen, as in covering the head in bed, and thus breathing an air rendered impure by repeated respiration; or by breathing a factitious air with less proportion of oxygen, which in common respiration passes through the moist membranes of the lungs, and mixes with the blood, the pulsations of the heart and arteries become weaker, and consequently quicker, by the defect of the stimulus of oxygen. And as these vessels are subject to perpetual motion, the accumulation of the sensorial power of irritation becomes so great by their lessened activity, that it excites the vessels next connected, the cutaneous capillaries for instance, into more energetic actions, so as to produce increased heat of the skin, and greater perspiration.

How exactly this resembles a continued fever with weak and quick pulse!—in the latter the action of the heart and arteries are lessened by defect of the excitement of the sensorial power of association, owing to the torpor or lessened actions of the stomach; hence the accumulation of the sensorial power of association in this case, as the accumulation of that of irritation in the former, becomes so abundant as to excite into increased action the parts most nearly connected, as the cutaneous capillaries.

In respect to the circumstance mentioned by Sydenham, that covering the head in bed in a short time relieved the pertinacious sickness of the patient, it must be observed, that when the action of the heart and arteries becomes weakened by the want of the due stimulus of the proper quantity of oxygen in the blood, an accumulation of the sensorial power of irritation occurs in the fibres of the heart and arteries, which then is expended on those of the capillary glands, increasing their actions and consequent secretions and heat. And then the stomach is thrown into stronger action, both by the greater excitement of its natural quantity of the sensorial power of association by the increased actions of the capillaries, and also by some increase of associability, as it had been previously a long time in a state of torpor, or less activity than natural, as evinced by its perpetual sickness.

In a manner somewhat similar to this, is the redness of the skin produced in angry people by the superabundance of the unemployed sensorial power of volition, as explained in Class IV. 2. 3. 5. Rubor ex irâ. From hence we learn how, when people in fevers with weak pulse, or in dropries, become insane, the abundance of the unemployed sensorial power of volition increases the actions of the whole moving system, and cures those diseases.

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7. As the orgasm of the capillaries in fevers with weak pulse is immediately caused by the torpid actions of the heart and arteries, as above explained, this supplies us with another indication of cure in such fevers, and that is to stimulate these organs. This may probably be done by some kind of medicines, which are known to pass into the blood unchanged in some of their properties. It is possible that nitre, or its acid, may pass into the blood and increase the colour of it, and thus increase its stimulus, and the same may be supposed of other salts, neutral or metallic? As *rubia tinctoria*, madder, colours the bones of young animals, it must pass into the blood with its colouring matter at least unchanged, and perhaps many other medicines may likewise affect the blood, and thus act by stimulating the heart and arteries, as well as by stimulating the stomach; which circumstance deserves further attention.

Another way of immediately stimulating the heart and arteries would be by transfusing new blood into them. Is it possible that any other fluid besides blood, as chyle, or milk, or water, could, if managed with great art, be introduced safely or advantageously into the vein of a living animal?

A third method of exciting the heart and arteries immediately is by increasing the natural stimulus of the blood, and is well worthy experiment in all fevers with weak pulse; and that

consists in supplying the blood with a greater proportion of oxygen; which may be done by respiration, if the patient was to breathe either oxygen gas pure, or diluted with atmospheric air, which might be given to many gallons frequently in a day, and by passing through the moist membranes of the lungs, according to the experiments of Dr. Priestley, and uniting with the blood, might render it more stimulant, and thus excite the heart and arteries into greater action! May not some easier method of exhibiting oxygen gas by respiration be discovered, as by using very small quantities of hyper-oxygenated marine acid gas very much diluted with atmospheric air?

XII. *Torpor of the Stomach and upper Intestines.*

1. The principal circumstance, which supports the increased action of the capillaries in continued fever with weak pulse, is their reverse sympathy with those of the stomach and upper intestines, or with those of the heart and arteries. The torpor of the stomach and upper intestines is apparent in continued fevers from the total want of appetite for solid food, beside the fickleness with which fevers generally commence, and the frequent diarrhoea with indigested stools, at the same time the thirst of the patient is sometimes

times urgent at the intervals of the sickness. Why the stomach can at this time take fluids by intervals, and not solids, is difficult to explain; except it be supposed, as some have affirmed, that the lacteal absorbents are a different branch from the lymphatic absorbents, and that in this case the former only are in a state of permanent torpor.

2. The torpor of the heart and arteries is known by the weakness of the pulse. When the actions of the absorbents of the stomach are diminished by the exhibition of small doses of digitalis, or become retrograde by larger ones, the heart and arteries act more feebly by direct sympathy; but the cellular, cutaneous, and pulmonary absorbents are excited into greater action. Whence in anasarca the fluids in the cellular membrane throughout the whole body are absorbed during the sickness, and frequently a great quantity of atmospheric moisture at the same time; as appears by the very great discharge of urine, which sometimes happens in these cases; and in ileus the prodigious evacuations by vomiting, which are often a hundred fold greater than the quantity swallowed, evince the great action of all the other absorbents during the sickness of the stomach.

3. But when the stomach is rendered permanently

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nently sick by an emetic drug, as by digitalis, it is not probable, that much accumulation of sensorial power is soon produced in this organ; because its usual quantity of sensorial power is previously exhausted by the great stimulus of the foxglove; and hence it seems probable, that the great accumulation of sensorial power, which now causes the increased action of the absorbents, is produced in consequence of the inactivity of the heart and arteries; which inactivity is induced by deficient excitement of the sensorial power of association between those organs and the stomach, and not by any previous exhaustion of their natural quantity of sensorial power; whereas in ileus, where the torpor of the stomach, and consequent sickness, is induced by reverse sympathy with an inflamed intestine, that is, by dissevered or defective association; the accumulation of sensorial power, which in that disease so violently actuates the cellular, pulmonary, and cutaneous absorbents, is apparently produced by the torpor of the stomach and lacteals, and the consequent accumulation of the sensorial power of association in them owing to their lessened action in sickness.

4. This accounts for the dry skin in fevers with weak pulse, where the stomach and the heart and arteries are in a torpid state, and for the sudden emaciation of the body; because the actions

actions of the cellular and cutaneous absorbents are increased by reverse sympathy with those of the stomach, or with those of the heart and arteries; that is by the expenditure of that sensorial power of association, which is accumulated in consequence of the torpor of the stomach and heart and arteries, or of either of them; this also explains the sudden absorption of the milk in puerperal fevers; and contributes along with the heat of the respired air to the dryness of the mucous membrane of the tongue and nostrils.

5. Besides the reverse sympathy, with which the absorbent vessels of the stomach and upper intestines act in respect to all the other absorbent vessels, as in the exhibition of digitalis, and in ileus; there is another reverse sympathy exists between the capillaries, or secretory vessels of the stomach, and those of the skin. Which may nevertheless be occasioned by the accumulation of sensorial power by the torpor of the heart and arteries, which is induced by direct sympathy with the stomach; thus when the torpor of the stomach remains in a fever-fit, which might otherwise have intermitted, the torpor of the heart and arteries remains also by direct sympathy, and the increased cutaneous capillary action, and consequent heat, are produced by reverse sympathy; and the fever is thus rendered continual, owing primarily to the torpor of the stomach.

6. The reverse sympathy, which exists between the capillaries of the stomach and the cutaneous capillaries, appears by the chillness of some people after dinner; and contrariwise by the digestion being strengthened, when the skin is exposed to cold air for a short time; as mentioned in Class IV. 1. 1. 4. and IV. 2. 1. 1. and from the heat and glow on the skin, which attends the action of vomiting; for though when sickness first commences, the skin is pale and cold; as it then partakes of the general torpor, which induces the sickness; yet after the vomiting has continued some minutes, so that an accumulation of sensorial power exists in the capillaries of the stomach, and of the skin, owing to their diminished action; a glow of the skin succeeds, with sweat, as well as with increased absorption.

7. Nevertheless in some circumstances the stomach and the heart and arteries seem to act by direct sympathy with the cutaneous capillaries, as in the flushing of the face and glow of the skin of some people after dinner; and as in fevers with strong pulse. In these cases there appears to be an increased production of sensorial power, either of sensation, as in the blush of shame; or of volition, as in the blush of anger; or of irritation, as in the flushed face after dinner above mentioned.

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This increased action of the capillaries of the skin along with the increased actions of the stomach and heart is perhaps to be esteemed a synchronous increase of action, rather than a sympathy between those organs. Thus the flushing of the face after dinner may be owing to the secretion of sensorial power in the brain being increased by the association of that organ with the stomach, in a greater proportion than the increased expenditure of it, or may be owing also to the stimulus of new chyle received into the blood.

8. When the stomach and the heart and arteries are rendered torpid in fevers, not only the cutaneous, cellular, and pulmonary absorbents are excited to act with greater energy; but also their correspondent capillaries and secreting vessels or glands, especially perhaps those of the skin, are induced into more energetic action. Whence greater heat, a greater secretion of perspirable matter, and of mucus; and a greater absorption of them both, and of aerial moisture. These reverse sympathies coincide with other animal facts, as in eruption of small-pox on the face and neck the feet become cold, while the face and neck are much flushed; and in the hemiplegia, when one arm and leg become disobedient to volition, the patient is perpetually moving the other. Which are well accounted for by the accumulation of sensorial

rial power in one part of an associated series of actions, when less of it is expended by another part of it; and by a deficiency of sensorial power in the second link of association, when too much of it is expended by the first.

9. This doctrine of reverse sympathy enables us to account for that difficult problem, why in continued fevers the increased action of the cutaneous, cellular, and pulmonary capillaries proceeds without interruption or return of cold fit; though perhaps with some exacerbations and remissions; and that during a quarter, or half, or three quarters, or a whole lunation; while at the same time the pulsations of the heart and arteries are weaker than natural.

To this should be added the direct sympathy, which exists between the peristaltic motions of the fibres of the stomach, and the pulsations of the heart. And that the stomach has become torpid by the too great stimulus of some poisonous or contagious matter; and this very intricate idea of continued fever with feeble pulse is reduced to curious simplicity.

The direct sympathy of the stomach and heart and arteries not only appears from the stronger and slower pulse of persons exhausted by fatigue, after they have drunk a glass of wine, and eaten a few mouthfuls; but appears also from the exhibition of large doses of digitalis; when the pa-

tient labours under great and incessant efforts to vomit, at the same time that the actions of the absorbent system are known to be much increased by the hasty absorption of the serous fluid in anasarca, the pulsations of the heart become slow and intermittent to an alarming degree. See Class IV. 2. 1. 17. and 18.

10. It would assist us much in the knowledge and cure of fevers, if we could always determine, which part of the system was primarily affected; and whether the torpor of it was from previous excess or defect of stimulus; which the industry of future observers must discover. Thus if the stomach be affected primarily, and that by previous excess of stimulus, as when certain quantities of opium, or wine, or blue vitriol, or arsenic, are swallowed, it is some time in recovering the quantity of sensorial power previously exhausted by excess of stimulus, before any accumulation of it can occur. But if it be affected with torpor secondarily, by sympathy with some distant part; as with the torpid capillaries of the skin, that is by defective excitement of the sensorial power of association; or if it be affected by defect of stimulus of food or of heat; it sooner acquires so much accumulation of sensorial power, as to be enabled to accommodate itself to its lessened stimulus by increase of its irritability.

Thus in the hemicrania the torpor generally commences

commences in a diseased tooth, and the membranes about the temple, and also those of the stomach become torpid by direct synchronous sympathy; and pain of the head, and sickness supervene; but no fever or quickness of pulse. In this case the torpor of the stomach is owing to defect of the sensorial power of association, which is caused by the too feeble actions of the membranes surrounding the diseased tooth, and thus the train of sympathy ceases here without affecting the motions of the heart and arteries; but where contagious matter is swallowed into the stomach, the stomach after a time becomes torpid from exhaustion of the sensorial power of irritation, and the heart and arteries act feebly from defect of the excitement of the power of association. In the former case the torpor of the stomach is conquered by accumulation of the power of association in one or two whole days; in the latter it recovers by accumulation of the power of irritation in three or four weeks.

In intermittent fevers the stomach is generally I believe affected secondarily by sympathy with the torpid cutaneous capillaries, or with some internal torpid viscous, and on this account an accumulation of sensorial power arises in a few hours sufficient to restore the natural irritability of this organ; and hence the hot fit succeeds, and the fever intermits. Or if this accumulation

of sensorial power becomes excessive and permanent, the continued fever with strong pulse is produced, or febris irritativa.

In continued fevers the stomach is frequently I suppose affected with torpor by previous excess of stimulus, and consequent exhaustion of sensorial power, as when contagious matter is swallowed with the saliva, and it is then much slower in producing an accumulation of sensorial power sufficient to restore its healthy irritability; which is a frequent cause of continued fever with weak pulse or febris inirritativa. Which consists, after the cold fit is over, in a more frequent and more feeble action of the heart and arteries, owing to their direct sympathy with the muscular fibres of the torpid stomach; together with an increased action of the capillaries, glands, and absorbents of the skin, and cellular membrane, owing to their reverse sympathy with the torpid capillaries, glands, and absorbents of the stomach, or with those of the heart and arteries.

Or in more accurate language. 1. The febris inirritativa, or fever with weak pulse, commences with torpor of the stomach, occasioned by previous exhaustion of sensorial power of irritation by the stimulus of contagious matter swallowed with the saliva. 2. The whole system becomes torpid from defect of the excitement of the sensorial power of association owing to the too feeble actions of the stomach, this is the cold fit. a.

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The whole system, except the stomach with the upper intestines, and the heart and arteries, falls into increased action, or orgasm, owing to accumulation of sensorial power of association during their previous torpor, this is the hot fit. 4. The stomach and upper intestines have not acquired their natural quantity of sensorial power of irritation, which was previously exhausted by violent action in consequence of the stimulus of contagious matter, and the heart and arteries remain torpid from deficient excitement of the sensorial power of association, owing to the too feeble actions of the stomach. 5. The accumulation of sensorial power of association in consequence of the torpor of the heart and arteries occasions a perpetual orgasm, or increased action of the capillaries.

11. From hence it may be deducted first, that when the torpor of the stomach first occurs, either as a primary effect, or as a secondary link of some associate train or circle of motions, a general torpor of the system sometimes accompanies it, which constitutes the cold fit of fever; at other times no such general torpor occurs, as during the operation of a weak emetic, or during seasickness.

Secondly. After a time it generally happens, that a torpor of the stomach ceases, and its actions are renewed with increase of vigour by accumulation

cumulation of sensorial power during its quiescence; as after the operation of a weak emetic, or at the intervals of sea-fickness, or after the paroxysm of an intermittent fever.

Thirdly. The stomach is sometimes much slower in recovering from a previous torpor, and is then the remote cause of continued fever with weak pulse; which is owing to a torpor of the heart and arteries, produced in consequence of the deficient excitement of the power of association by the too weak actions of the stomach; and to an orgasm of the capillaries of the other parts of the system, in consequence of the accumulation of sensorial power occasioned by the inactivity of the heart and arteries.

Fourthly. The torpor of the stomach is sometimes so complete, that probably the origin of its nerves is likewise affected, and then no accumulation of sensorial power occurs. In this case the patient dies for want of nourishment; either in three or four weeks, of the inirritative fever; or without quick pulse, by what we have called parefis irritativa. Or he continues many years in a state of total debility. When this torpor suddenly commences, the patient generally suffers epileptic fits or temporary insanity from the disagreeable sensation of so great a torpor of the stomach; which also happens sometimes at the eruption of the distinct small-pox; whence we have termed this disease anorexia epileptica.

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See Class II. 2. 2. 1. and III. 1. 1. 7. and Suppl. I. 14. 3.

Fifthly. When this torpor of the stomach is less in degree or extent, and yet without recovering its natural irritability by accumulation of sensorial power, as it does after the cold fit of intermittent fever, or after the operation of mild emetics, or during syncope; a permanent defect of its activity, and of that of the upper intestines, remains, which constitutes apergia, cardialgia, hypochondriasis, and hysteria. See Class I. 3. 1. 3. and I. 2. 4. 5.

Sixthly. If the torpor of the stomach be induced by direct sympathy, as in consequence of a previous torpor of the liver, or spleen, or skin, an accumulation of sensorial power will sooner be produced in the stomach; because there has been no previous expenditure of it, the present torpor of the stomach arising from defect of association. Hence some fevers perfectly intermit, the stomach recovering its complete action after the torpor and consequent orgasm, which constitute the paroxysm of fever, are terminated.

Seventhly. If the torpor of the stomach be owing to defect of irritation, as to the want of food, an accumulation of sensorial power soon occurs with an increase of digestion, if food be timely applied; or with violent inflammation, if food be given in too great quantity after very long abstinence.

Eighthly.

Eighthly. If the torpor of the stomach be induced by defect of pleasurable sensation, as when sickness is caused by the suggestion of nauseous ideas; an accumulation of sensorial power soon occurs, and the sickness ceases with the return of hunger; for in this case the inactivity of the stomach is occasioned by the subduction of agreeable sensation, which acts as a subduction of stimulus, and not by exhausting the natural quantity of sensorial power in the fibres or nerves of the stomach.

Ninthly. If the torpor of the stomach be induced by a twofold cause, as in sea-sickness. See *Vertigo rotatoria*. Class IV. 2. 1. 10. in which the first link of association acts too strongly, and in consequence expends more than usual of the sensorial power of irritation; and secondly in which sensation is produced between the links of association, and disfigures or enfeebles them; the accumulation of sensorial power soon occurs in the stomach; as no previous expenditure of it in that organ has occurred. Whence in sea-sickness the persons take food with eagerness at times, when the vertigo ceases for a few minutes.

Tenthly. If the gastric torpor be induced by previous violent exertion, as after intoxication, or after contagious matter has been swallowed, or some poisons, as *digitalis*, or *arsenic*; an accumulation of sensorial power very slowly succeeds; whence long sickness, or continued fever, be-

cause the quantity of sensorial power already wasted must first be renewed, before an accumulation of it can be produced.

12. This leads us to a second indication of cure in continued fevers, which consists in strengthening the actions of the stomach; as the first indication consisted in decreasing the actions of the cutaneous capillaries and absorbents. The actions of the stomach may sometimes be increased by exhibiting a mild emetic; as an accumulation of sensorial power in the fibres of the stomach is produced during their retrograde actions. Besides the evacuation of any noxious material from the stomach, and duodenum, and from the absorbents, which open their mouths on their internal surfaces, by their retrograde motion.

It is probable, that when mild emetics are given, as ipecacuanha, or antimonium tartaratum, or infusion of chamomile, they are rejected by an inverted motion of the stomach and œsophagus in consequence of disagreeable sensation, as dust is excluded from the eye; and these actions having by previous habit been found effectual, and that hence there is no exhaustion of the sensorial power of irritation. But where strong emetics are administered, as digitalis, or contagious matter, the previous exhaustion of the sensorial power of irritation seems to be a cause of

of the continued retrograde actions and sickness of the stomach. An emetic of the former kind may therefore strengthen the power of the stomach immediately after its operation by the accumulation of sensorial power of irritation during its action. See Class IV. 1. 1.

Another method of decreasing the action of the stomach for a time, and thence of increasing it afterwards, is by the accumulation of the sensorial power of irritation during its torpor; is by giving ice, iced water, iced creams, or iced wine. This accounts for the pleasure, which many people in fevers with weak pulse express on drinking cold beverage of any kind.

A second method of exciting the stomach into action, and of decreasing that of the capillaries in consequence, is by the stimulus of wine, opium, bark, metallic salts of antimony, steel, copper, arsenic, given in small repeated quantities; which so long as they render the pulse slower are certainly of service, and may be given warm or cold, as most agreeable to the patient. For it is possible, that the capillaries of the stomach may act too violently, and produce heat, at the same time that the large muscles of it may be in a torpid state; which curious circumstance future observations must determine.

Thirdly. Hot fomentation on the region of the stomach might be of most essential service by its stimulus, as heat penetrates the system not

by the absorbent vessels, but by external influence ; whence the use of hot fomentation to the head in torpor of the brain ; and the use of hot bath in cases of general debility, which has been much too frequently neglected from a popular error occasioned by the unmeaning application of the word relaxation to animal power. If the fluid of heat could be directed to pass through particular parts of the body with as little diffusion of its influence, as that of electricity in the shocks from the coated jar, it might be employed with still greater advantage.

Fourthly. The use of repeated small electric shocks through the region of the stomach might be of service in fevers with weak pulse, and well deserves a trial ; twenty or thirty small shocks twice a day for a week or two would be a promising experiment.

Fifthly. A blister on the back, or sides, or on the pit of the stomach, repeated in succession, by stimulating the skin frequently strengthens the action of the stomach by exciting the sensorial power of association ; this especially in those fevers where the skin of the extremities, as of the hands or nose or ears, sooner becomes cold, when exposed to the air, than usual.

Sixthly. The action of the stomach may be increased by preventing too great expenditure of sensorial power in the link of previous motion with which it is catenated, especially if the action

tion of that link be greater than natural. Thus as the capillaries of the skin act too violently in fevers with weak pulse, if these are exposed to cold air or cold water, the sensorial power, which previously occasioned their orgasm, becomes accumulated, and tends to increase the action of the stomach; thus in those fevers with weak pulse and hot skin, if the stomach be stimulated by repeated small doses of bark and wine or opium, and be further excited at the same time by accumulation of sensorial power occasioned by rendering the capillaries torpid by cold air or water, this twofold application is frequently attended with visible good effect.

By thus stimulating the torpid stomach into greater action, the motions of the heart and arteries will likewise be increased by the greater excitement of the power of association. And the capillaries of the skin will cease to act so violently, from their not possessing so great a superfluity of sensorial power as during the greater quiescence of the stomach and of the heart and arteries. Which is in some circumstances similar to the curious phenomenon mentioned in Class IV, 2. 2. 10; where, by covering the chill feet with flannel at the eruption of the small-pox, the points of the flannel stimulate the skin of the feet into greater action, and the quantity of heat, which they possess, is also confined, or insulated, and further increases by its stimulus the activity of the

cutaneous vessels of the feet; and by that circumstance abates the too great action of the capillaries of the face, and the consequent heat of it.

XIII. *Case of continued Fever.*

The following case of continued fever which I frequently saw during its progress, as it is less complicate than usual, may illustrate this doctrine. Master S. D. an active boy about eight years of age, had been much in the snow for many days, and sat in the classical school with wet feet; he had also about a fortnight attended a writing school, where many children of the lower order were instructed. He was seized on February the 8th, 1795, with great languor, and pain in his forehead, with vomiting and perpetual sickness; his pulse weak, but not very frequent. He took an emetic, and on the next day had a blister, which checked the sickness only for a few hours; his skin became perpetually hot, and dry; and his tongue white and furred; his pulse when asleep about 104 in a minute, and when awake about 112.

Fourth day of the disease. He has had another blister, the pain of his head is gone, but the sickness continues by intervals; he refuses to take any solid food, and will drink nothing but milk, or milk and water, cold. He has two or three very liquid stools every day, which are

sometimes green, but generally of a darkish yellow, with great flatulency both upwards and downwards at those times. An antimonial powder was once given, but instantly rejected; a spoonful of decoction of bark was also exhibited with the same event. His legs are bathed, and his hands and face are moistened twice a day for half an hour in warmish water, which is nevertheless much colder than his skin.

Eighth day. His skin continues hot and dry without any observable remissions, with liquid stools and much flatulency and sickness; his water when observed was of a straw colour. He has asked for cider, and drinks nearly a bottle a day mixed with cold water, and takes three drops of laudanum twice a day.

Twelfth day. He continues much the same, takes no milk, drinks only cider and water, skin hot and dry, tongue hot and furred, with liquid stools, and sickness always at the same time; sleeps much.

Sixteenth day. Was apparently more torpid, and once rather delirious; pulse 112. Takes only capillaire and water; sleeps much.

Twentieth day. Pulse 100, skin dry but less hot, liquid stools not so frequent, he is emaciated to a great degree, he has eaten half a tea-cup full of custard to day, drinks only capillaire and water, has thrice taken two large spoonfuls of decoction of bark with three drops of laudanum,

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refuses to have his legs bathed, and will now take nothing but three drops of laudanum twice a day.

Twenty-fourth day. He has gradually taken more custard every day, and began to attend to some new playthings, and takes wine syllabub.

Twenty-eighth day. He daily grows stronger, eats eggs, and bread and butter, and sleeps immediately after his food, can creep on his hands and knees, but cannot stand erect.

Thirty-second day. He cannot yet stand alone safely, but seems hourly to improve in strength of body, and activity of mind.

In this case the remote cause of his fever could not be well ascertained, as it might be from having his feet cold for many successive days, or from contagion; but the latter seems more probable, because his younger brother became ill of a similar fever about three weeks afterwards, and probably received the infection from him. The disease commenced with great torpor of the stomach, which was shewn by his total aversion to solid food, and perpetual sickness; the watery stools, which were sometimes green, or of a darkish yellow, were owing to the acrimony, or acidity, of the contents of the bowels; which as well as the flatulency were occasioned by indigestion. This torpor of the stomach continued throughout the whole fever, and when it ceased, the fever ceased along with it.

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The contagious material of this fever I suppose to have been mixed with the saliva, and swallowed into the stomach ; that it excited the vessels, which constitute the stomach, into the greatest irritative motion like arsenic ; *which might not be perceived, and yet might render that organ paralytic or inirritable in a moment of time* ; as animals sometimes die, by one single exertion, and consequent paralyis, without a second struggle ; as by lightning, or being shot through the back part of the brain ; of both which I have seen instances. I had once an opportunity of inspecting two oxen, a few minutes after they were killed by lightning under a crab-tree on moist ground in long grass ; and observed, that they could not have struggled, as the grass was not pressed or bent near them ; I have also seen two horses shot through the cerebellum, who never once drew in their legs after they first stretched them out, but died instantaneously ; in a similar manner the lungs seem to be rendered instantly inanimate by the fumes of burning sulphur.

The lungs may be sometimes primarily affected with contagious matter floating in the atmosphere as well as the stomach, as mentioned in article 9. of this Supplement. But probably this may occur much less frequently, because the oxygene of the atmosphere does not appear to be taken into the blood by animal absorption, as the saliva in the stomach, but passes through the moist membranes into

into the blood, like the ethereal fluids of electricity or heat, or by chemical attraction, and in consequence the contagious matter may be left behind; except it may sometimes be absorbed along with the mucus; of which however in this case there appeared no symptoms.

The tonsils are other organs liable to receive contagious matter, as in the small-pox, scarlet-fever, and in other sensitive irritated fevers; but no symptom of this appeared here, as the tonsils were at no time of the fever inflamed, though they were in this child previously uncommonly large.

The pain of the forehead does not seem to have been of the internal parts of the head, because the nerves, which serve the stomach, are not derived from the anterior part of the brain; but it seems to have been owing to a torpor of the external membranes about the forehead from their direct sympathy with those of the stomach; that is, from the deficient excitement of the sensorial power of association; and seemed in some measure to be relieved by the emetics and blisters.

The pulsations of the heart were weaker and in consequence quicker than natural, owing to their direct sympathy with the torpid peristaltic motions of the stomach; that is to the deficient excitement of the sensorial power of association.

The action of the cutaneous capillaries and absorbents were stronger than natural, as appeared by

by the perpetual heat and dryness of the skin; which was owing to their reverse sympathy with the heart and arteries. This weaker and quicker action of the heart and arteries, and the stronger action of the cutaneous capillaries and absorbents, continued throughout the disease, and may be said to have constituted the fever, of which the torpor of the stomach was the remote cause.

His tongue was not very much furred or very dry, nor his breath very hot; which shewed, that there was no great increase of the action of the mucous absorbents, nor of the pulmonary capillaries, and yet sufficient to produce great emaciation. His urine was nearly natural both in quantity and colour; which shewed, that there was no increase of action either of the kidneys, or of the urinary absorbents.

The bathing his legs and hands and face for half an hour twice a day seemed to refresh him, and sometimes made his pulse flower, and thence I suppose stronger. This seems to have been caused by the water, though subtepid, being much below the heat of his skin, and consequently contributing to cool the capillaries, and by satiating the absorbents to relieve the uneasy sensation from the dryness of the skin.

He continued the use of three drops of tincture of opium from about the eighth day to the twenty-fourth, and for the three preceding days took along with it two large spoonfuls of an infusion of

of bark in equal parts of wine and water. The former of these by its stimulus seemed to decrease his languor for a time, and the latter to strengthen his returning power of digestion.

The daily exacerbations or remissions were obscure, and not well attended to; but he appeared to be worse on the fourteenth or fifteenth days, as his pulse was then quickest, and his inattention greatest; and he began to get better on the twentieth or twenty-first days of his disease; for the pulse then became less frequent, and his skin cooler, and he took rather more food: these circumstances seemed to observe the quarter periods of lunation.

XIV. *Termination of continued Fever.*

1. When the stomach is primarily affected with torpor not by defect of stimulus, but in consequence of the previous exhaustion of its sensorial power; and not secondarily by its association with other torpid parts; it seems to be the general cause of the weak pulsations of the heart and arteries, and the consequent increased action of the capillaries, which constitute continued fever with weak pulse. In this situation if the patient recovers, it is owing to the renovation of life in the torpid stomach, as happens to the whole system in winter-sleeping animals. If he perishes, it

it is owing to the exhaustion of the body for want of nourishment occasioned by indigestion ; which is hastened by the increased actions of the capillaries and absorbents.

2. When the stomach is primarily affected by defect of stimulus, as by cold or hunger ; or secondarily by defect of the power of association, as in intermittent fevers ; or lastly in consequence of the introduction of the sensorial power of sensation, as in inflammatory diseases ; the actions of the heart and arteries are not diminished, as when the stomach is primarily affected with torpor by its previous exhaustion of sensorial power, but become greatly increased, producing irritative or inflammatory fever. Where this fever is continued, though with some remissions and exacerbations, the excessive action is at length so much lessened by expenditure of sensorial power, as to gradually terminate in health ; or it becomes totally exhausted, and death succeeds the destruction of the irritability and associability of the system.

3. There is also another termination of the diseases in consequence of great torpor of the stomach, which are not always termed fevers ; one of these is attended with so great and universal torpor, that the patient dies in the first cold fit ; that is, within twelve hours or less of the first seizure ; this is commonly termed sudden

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death.

death. But the quickness of the pulse, and the coldness with shuddering, and with sick stomach, distinguished a case, which I lately saw, from the sudden deaths occasioned by apoplexy, or ruptured blood-vessels.

In hemicrania I believe the stomach is always affected secondarily, as no quickness of pulse generally attends it, and as the stomach recovers its activity in about two whole days. But in the following case, which I saw last week, I suppose the stomach suddenly became paralytic, and caused in about a week the death of the patient. Miss _____, a fine young lady about nineteen, had bathed a few times, about a month before, in a cold spring, and was always much indisposed after it; she was seized with sickness, and cold shuddering, with very quick pulse, which was succeeded by a violent hot fit; during the next cold paroxysm she had a convulsion fit; and after that symptoms of insanity, so as to strike and bite the attendants, and to speak furious language; the same circumstances occurred during a third fit, in which I believe a strait waistcoat was put on, and some blood taken from her; during all this time her stomach would receive no nutriment, except once or twice a little wine and water. On the seventh day of the disease, when I saw her, the extremities were cold, the pulse not to be counted, and she was unable to swallow, or to speak; a clyster was used with turpentine and musk

musk and opium, with warm fomentations, but she did not recover from that cold fit.

In this case the convulsion fit and the insanity seem to have been violent efforts to relieve the disagreeable sensation of the paralytic stomach; and the quick pulse, and returning fits of torpor and of orgasm, evinced the disease to be attended with fever, though it might have been called anorexia maniacalis, or epileptica.

4. Might not many be saved in these fevers with weak pulse for a few weeks by the introduction of blood into a vein, once in two or three days; which might thus give further time for the recovery of the torpid stomach? Which seems to require some weeks to acquire its former habits of action, like the muscles of paralytic patients, who have all their habits of voluntary associations to form afresh, as in infancy.

If this experiment be again tried on the human subject, it should be so contrived, that the blood in passing from the well person to the sick one should not be exposed to the air; it should not be cooled or heated; and it should be measured; all which may be done in the following manner. Procure two silver pipes, each about an inch long, in the form of funnels, wide at top, with a tail beneath, the former something wider than a swan-quill, and the latter less than a small crow-quill. Fix one of these silver funnels by its wide end to one

end

end of the gut of a chicken fresh killed about four or six inches long, and the other to the other end of the gut; then introduce the small end of one funnel into the vein of the arm of a well person downwards towards the hand; and laying the gut with the other end on a water-plate heated to 98 degrees in a very warm room, let the blood run through it. Then pressing the finger on the gut near the arm of the well person, slide it along so as to press out one gutful into a cup, in order to ascertain the quantity by weight. Then introduce the other end of the other funnel into a similar vein in the arm of the sick person upwards towards the shoulder; and by sliding one finger, and then another reciprocally, along the chicken's gut, so as to compress it, from the arm of the well person to the arm of the sick one, the blood may be measured, and thus the exact quantity known which is given and received. See Class I. 2. 3. 25.

XV. *Inflammation excited in Fever.*

1. When the actions of any part of the system of capillaries are excited to a certain degree, sensation is produced, along with a greater quantity of heat, as mentioned in the fifth article of this supplement. When this increased capillary action becomes still more energetic, by the combined

biked sensorial powers of sensation with irritation, new fibres are secreted, or new fluids, (which harden into fibres like the mucus secreted by the silk-worm, or spider, or pinna,) from which new vessels are constructed; it is then termed inflammation: if this exists in the capillary vessels of the cellular membrane or skin only, with feeble pulsations of the heart and arteries, the febris sensitiva inirritata, or malignant fever, occurs; if the coats of the arteries are also inflamed, the febris sensitiva irritata, or inflammatory fever, exists.

In all these fevers the part inflamed is called a phlegmon, and by its violent actions excites so much pain, that is, so much of the sensorial power of sensation, as to produce more violent actions, and inflammation, throughout the whole system. Whence great heat from the excited capillaries of the skin, large and quick pulsations of the heart, full and hard arteries, with great universal secretions and absorptions. These perpetually continue, though with exacerbations and remissions; which seem to be governed by solar or lunär influence.

2. In this situation there generally, I suppose, exists an increased activity of the secerning vessels of the brain, and consequently an increased production of sensorial power; in less violent quantity of this disease however the increase of the

action of the heart and arteries may be owing simply to the accumulation of sensorial power of association in the stomach, when that organ is affected by sympathy with some inflamed part. In the same manner as the capillaries are violently and permanently actuated by the accumulation of the sensorial power of association in the heart and arteries, when the stomach is affected primarily by contagious matter, and the heart and arteries secondarily. Thus I suspect, that in the distinct small-pox the stomach is affected secondarily by sympathy with the infected tonsils or inoculated arm; but that in the confluent small-pox the stomach is affected primarily, as well as the tonsils, by contagious matter mixed with the saliva, and swallowed.

3. In inflammatory fevers with great arterial action, as the stomach is not always affected with torpor, and as there is a direct sympathy between the stomach and heart, some people have believed, that nauseating doses of some emetic drug, as of *antimonium tartarizatum*, have been administered with advantage, abating by direct sympathy the actions of the heart. This theory is not ill-founded, and the use of *digitalis*, given in small doses, as from half a dram to a dram of the saturated tincture, two or three times a day, as well as other less violent emetic drugs, would be worth the attention of hospital physicians.

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In three cases of what I believed to be inflammatory rheumatism, two of them attended with pain of the side, and difficult respiration, and the other with swelled joints, after repeated venefections and moderate cathartics, and mild doses of antimonials, without success, the tincture of digitalis given in the small dose of ten drops every six hours, appeared to abate the quickness and hardness of the pulse in two or three or four days, without inducing any degree of sickness.

Sickness might also be produced probably with advantage by whirling the patient in a chair suspended from the ceiling by two parallel cords; which after being revolved fifty or a hundred times in one direction, would return with great circular velocity, and produce vertigo, similar I suppose to sea-sickness. And lastly the sickness produced by respiring an atmosphere mixed with one tenth of carbonated hydrogen, discovered by Mr. Watt, and published by Dr. Beddoes, would be well worthy exact and repeated experiment.

4. Cool air, cool fomentations, or ablutions, are also useful in this inflammatory fever; as by cooling the particles of blood in the cutaneous and pulmonary vessels, they must return to the heart with less stimulus, than when they are heated above the natural degree of ninety-eight. For this purpose snow and ice have been scattered on the patients in Italy; and cold bathing has been

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used

used at the eruption of the small-pox in China, and both, it is said, with advantage. See Class III.

2. 1. 12. and Suppl. I. 8.

5. The lancet however with repeated mild cathartics is the great agent in destroying this enormous excitement of the system, so long as the strength of the patient will admit of evacuations. Blisters over the painful part, where the phlegmon or topical inflammation is situated, after great evacuation, is of evident service, as in pleurisy. Warm bathing for half an hour twice a day, when the patient becomes enfeebled, is of great benefit, as in peripneumony and rheumatism.

6. When other means fail of success in abating the violent excitement of the system in inflammatory diseases, might not the shaved head be covered with large bladders of cold water, in which ice or salt had been recently dissolved; and changed as often as necessary, till the brain is rendered in some degree torpid by cold?—Might not a greater degree of cold, as iced water, or snow, be applied to the cutaneous capillaries?

7. Another experiment I have frequently wished to try, which cannot be done in private practice, and which I therefore recommend to some hospital physician; and that is, to endeavour to still the violent actions of the heart and arteries, after due

due evacuations by venefection and cathartics, by gently compressing the brain. This might be done by suspending a bed, so as to whirl the patient round with his head most distant from the centre of motion, as if he lay across a mill-stone, as described in Sect. XVIII. 20. For this purpose a perpendicular shaft armed with iron gudgeons might have one end pass into the floor, and the other into a beam in the ceiling, with an horizontal arm, to which a small bed might be readily suspended.

By thus whirling the patient with increasing velocity sleep might be produced, and probably the violence of the actions of the heart and arteries might be diminished in inflammatory fevers; and, as it is believed, that no accumulation of sensorial power would succeed a torpor of the origin of the nerves, either thus procured by mechanical compression, or by the bladder-cap of cold water above described, the lives of thousands might probably be saved by thus extinguishing the exacerbations of febrile paroxysms, or preventing the returns of them.

In fevers with weak pulse sleep, or a degree of stupor, thus produced, might prevent the too great expenditure of sensorial power, and thus contribute to preserve the patient. See Class I. 2. 5. 10. on stupor. What might be the consequence of whirling a person with his head next the centre of motion, so as to force the blood from the brain

into the other parts of the body, might be discovered by cautious experiment without danger, and might probably add to our ability of curing fever.

Mr. Kelly, in his observations on compression, Edinb. 1797, asserts, that by compressing the two subclavian arteries, as they pass over the first rib, more blood will compress the brain, and produce a kind of apoplectic state similar to that, which may occur by the centrifugal force, if the patient was whirled round as above described. And adds, that by this compression of the two subclavian arteries a greater quantity of blood will be circulated through the head, whence the patient soon complains of drowsiness and vertigo; and that hence different species of headaches are soon removed, especially those which depend on defect of stimulation.

XVI. *Recapitulation.*

1. The sensorial power causes the contraction of the fibres, and is excited into action by four different circumstances, by the stimulus of external bodies, by pain or pleasure, by desire or aversion, or by the previous motions of other contracting fibres. In the first situation it is called the sensorial power of irritation, in the second the sensorial power of sensation, in the third the sensorial

sensorial power of volition, and in the fourth the sensorial power of association.

Many parts of the body are excited into perpetual action, as the sanguiferous vessels consisting of the heart, arteries, and veins; others into nearly perpetual action, as the conglomerate and capillary glands; and others into actions still somewhat less frequent, as the alimentary canal, and the lacteal and lymphatic absorbents with their conglobate glands: all these are principally actuated by the sensorial powers of irritation, and of association; but in some degree or at some times by those of sensation, and even of volition. There are three kinds of stimulus, which may easily be occasionally diminished, that of heat on the skin, of food in the stomach, and of the oxygenous part of the atmosphere, which mixes with the blood in respiration, and stimulates the heart and arteries.

2. When any parts, which are naturally excited into perpetual action by stimulus, become torpid or less active from decrease of that stimulus; there first occurs a decrease of the activity of the parts next catenated with them; thus going into cold water produces a torpor of the capillary vessels of the lungs, as is known by the difficult respiration, which immediately occurs; for the sensorial power of association, which naturally contributes to actuate the lungs, is now

less excited by the decreased actions of the cutaneous vessels, with which they are catenated. This constitutes the cold fit of fever.

There next occurs an accumulation of the sensorial power of irritation in the parts, which were torpid from defect of stimulus, as the cutaneous vessels for instance when exposed to cold air; and a similar accumulation of the sensorial power of association occurs in the parts which were catenated with the former, as the vessels of the lungs in the example above mentioned. Whence, if the subduction of stimulus has not been too great, so as to impair the health of the part, the activity of the irritative motions returns, even though the stimulus continues less than usual; and those of the associate motions become considerably increased, because these latter are now excited by the previous fibrous motions, which now act as strong or stronger than formerly, and have also acquired an accumulation of the sensorial power of association. This accounts for the curious event of our becoming warm in a minute or two after remaining in water of about 80 degrees of heat, as in the bath at Buxton; or in the cold air of a frosty morning of about 30 degrees of heat.

But if the parts thus possessed of the accumulated sensorial powers of irritation and of association be exposed again to their natural quantity of stimulus, a great excess of activity supervenes; because

because the fibres, which possess accumulated irritation, are now excited by their usual quantity of stimulus ; and those which possess accumulated association, are now excited by double or treble the quantity of the preceding irritative fibrous motions, with which they are catenated ; this constitutes the hot fit of fever.

Another important circumstance occurs, when the parts, which are torpid from decreased stimulus, do not accumulate a quantity of sensorial power sufficient for the purpose of renewing their own natural quantity of action ; but are nevertheless not so torpid, as to have the life of the part impaired. In this situation the superabundance of the accumulated power of irritation contributes to actuate the associate motions next catenated with them. Thus, when a person breathes air with less oxygene than natural, as by covering his head in bed, and thus respiring the same atmosphere repeatedly, the heart and arteries become less active by defect of the stimulus of oxygene ; and then the accumulation of sensorial power of irritation becomes instantly very great, as these organs are subject to perpetual and energetic action. This accumulation nevertheless is not so great as to renew their own activity under this defect of stimulus, but yet is in sufficient abundance to increase the associability of the next link of catenation, that is, to actuate the capillaries of the skin with great and perpetual increase of

of energy. This resembles continued fever with weak pulse; in which the accumulation of the sensorial power caused by the lessened motions of the heart and arteries, actuates the capillaries with increase of energy.

3. When the accumulation of the sensorial power of association, which is caused as above explained by deficient excitement owing to the lessened quantity of action of the irritative fibrous motions, with which the associate train is cate-nated, is not in quantity sufficient to renew the natural actions of the first link of an associate train of motions; it is nevertheless frequently so abundant as to actuate the next link of the associated train with unnatural energy by increasing its associability; and that in a still greater degree if that second link of the associated train was previously in a torpid state, that is, had previously acquired some accumulation of the sensorial power of association. This important circumstance of the animal economy is worthy our most accurate attention. Thus if the heart and arteries are deprived of their due quantity of the stimulus of oxygene in the blood, a weak and quick pulse ensues, with an accumulation of the sensorial power of irritation; next follows an increase of the action of the capillaries by the super-abundance of this accumulated power of irritation; but there also exists an accumulation of the power

of

of association in these acting capillaries, which is not now excited by the deficient actions of the heart and arteries; but which by its abundance contributes to actuate the next link of association, which is the sick stomach in the case related from Sydenham in Class IV. 1. 1. 2. and explained in this Supplement I. 4. And as this sick stomach was in a previous state of torpor, it might at the same time possess an accumulation of some sensorial power, which, if it was of association, would be thus more powerfully excited by the increased actions of the capillaries; which existed in consequence of the weak action of the heart and arteries. This also resembles in some respects the continued fevers with weak pulse, and with increased activity of the capillaries.

4. When a torpor of some irritative motions occurs from a previous exhaustion of the sensorial power of irritation by the action of some very great stimulus, it is long before any accumulation of the sensorial power of irritation is produced; as is experienced in the sickness and languor, which continues a whole day after a fit of drunkenness. But nevertheless there occurs an accumulation of the sensorial power of association in the first link of the associate train of motions, which is catenated with these torpid irritative ones; which accumulation is owing to deficient excitement of that sensorial power in the first link of

of the associate train. This first link therefore exists also in a less active or torpid state, but the accumulation of the sensorial power of association by its superabundance contributes to actuate the second link of the associate train with unnatural quantity of motion; and that though its own natural quantity of the power of association is not excited by the deficient action of preceding fibrous motions.

When this happens to the stomach, as after its irritative motions have been much exerted from the unnatural stimulus of wine, or opium, or of contagious matter mixed with the saliva, a torpor or inactivity of it succeeds for a greater or less length of time; as no accumulation of the sensorial power of irritation can occur, till the natural quantity, which has been previously expended, is first restored. Then the heart and arteries, which are next in catenation, become less active from the want of sufficient excitement of the sensorial power of association, which previously contributed to actuate them. This sensorial power of association therefore becomes accumulated, and by its superabundance contributes to actuate the link next in association, which has thus acquired so great a degree of associability, as to overbalance the less quantity of the excitement of it by the torpid action of the previous or first associate link. This happens to the capillaries, when the heart and arteries are affected as above by the torpor of the stomach, when it is occasioned

occasioned by previous great expenditure of its sensorial power, and thus constitutes fever with weak pulse, which is here termed inirritative fever, typhus mitior.

5. When a deficiency of stimulus is too great or too long continued, so as to impair the life of the part, no further accumulation of sensorial power occurs; as when the skin is long exposed to cold and damp air. In that case the link in catenation, that is, the first of the associate train, is rendered torpid by defect of excitement of its usual quantity of the sensorial power of association, and from there being no accumulation of the sensorial power of irritation to increase its associability, and thus to contribute to actuate it by overbalancing the defect of the excitement of its association.

Thus on riding long and slowly on a cold and damp day, the exhalation of the vapour, which is impinged on the skin, as the traveller proceeds, carries away his warmth faster, than it is generated within the system; and thus the capillaries of the skin have their actions so much impaired after a time, that no accumulation of the sensorial power of irritation occurs; and then the stomach, the motions of which are catenated with those of the capillaries, ceases to act from the deficient excitement of the power of association; and indigestion and flatulency succeed, instead of the

increased digestion and hunger, which occur, when the cutaneous capillaries are exposed to a less degree of cold, and for a shorter time. In which latter situation the accumulation of the sensorial power of irritation increases by its superabundance the associability of the fibres of the stomach, so as to overbalance the defect of the excitement of their association.

6. The stomach is affected secondarily in fevers with strong pulse, as in those with weak pulse it is affected primarily. To illustrate this doctrine I shall relate the following case of Mr. Y——. He was a young man rather intemperate in the use of wine or beer, and was seized with a cold fit, and with a consequent hot one with strong pulse; on examining his hypochondrium an oblong tumour was distinctly felt on the left side of the stomach, which extended six or eight inches downward, and was believed to be a tumour of the spleen, which thus occasioned by its torpor the cold fit and consequent hot fit of fever with strong pulse. This fever continued, though with remissions, for two or three weeks; and the patient repeatedly lost blood, used cathartics with calomel and senna, and had frequent antimonial and saline medicines. And after he was much weakened by evacuations, the peruvian bark and small doses of steel removed the fever, but the

tumour remained many years during the remainder of his life.

In this case the tumour of the spleen was occasioned by the torpor of the absorbent vessels; while the secerning vessels continued somewhat longer to pour their fluids into the cells of it. Then the inactivity of this viscus affected the whole system with torpor by the deficient excitement of the sensorial power of association, which contributes along with the irritation caused by their specific stimuli to actuate the whole sanguiferous, secerning, and absorbent vessels; and along with these the stomach, which possesses perhaps greater mobility, or promptitude to torpor or to orgasm, than any other part. And after a time all these parts recover their actions by the accumulation of their sensorial power of association. But the spleen not recovering its action from the accumulation of its power of irritation, as appeared from the continuance of the tumour, still affects the stomach by its defective irritative motions ceasing to excite the association, which ought to contribute to actuate it.

Hence the stomach continues torpid in respect to its motions, but accumulates its power of association; which is not excited into action by the defective motions of the spleen; this accumulation of the sensorial power of association now by its superabundance actuates the next link of associate motions, which consists of the heart and arteries,

arteries, into greater energy of action than natural, and thus causes fever with strong pulse; which, as it was supposed to be most frequently excited by increase of irritation, is called irritative fever or synocha.

Similar to this in the small-pox, which is given by inoculation, the stomach is affected secondarily, when the fever commences; and hence in this small-pox the pulsations of the heart and arteries are frequently stronger than natural; but never weaker, for the reasons above given. Whereas in that small-pox, which is caused by the stomach being primarily affected, by the contagious matter being swallowed with the saliva, whether the tonsils are at the same time affected or not, the pulsations of the heart and arteries become weak, and the inirritative fever is produced, as explained above, along with the confluent small-pox. This unfolds the cause of the mildness of the inoculated small-pox; because in this disease the stomach is affected secondarily, whereas in the natural small-pox it is frequently affected primarily by swallowing the contagious matter mixed with saliva.

In the measles I suppose the contagious matter to be dissolved in the air, and therefore not liable to be mixed with the saliva; whereas the variolous matter is probably only diffused in the air, and thence more readily mixed with the saliva in the mouth during respiration. This difference appears more

more probable, as the small-pox I believe is always taken at a less distance from the diseased person than is necessary to acquire the measles. The contagion of the measles affects the membranes of the nostrils, and the secretion of tears in consequence, but never I suspect the stomach primarily, but always secondarily; whence the pulsation of the heart and arteries is always stronger than natural, so as to bear the lancet at any period of the disease.

The great mildness sometimes, and fatality at other times, of the scarlet fever may depend on the same circumstance; that is, on the stomach being primarily or secondarily affected by the contagious matter, observing that the tonsils may be affected at the same time with the stomach. Should this prove to be the case, which future observations must determine, what certain advantage must arise from the inoculation of this disease! When it is received by the skin primarily I suppose no sore throat attends it, nor fever with weak pulse; when it is received by the stomach primarily, the tonsils are affected at the same time, and the torpor of the stomach produces inirritative fever, and the mortification of the tonsils succeeds.

We may hence conclude, that when the torpor of the stomach is either owing to defect of stimulus, which is not so great as to impair the life of the part, as in moderate hunger, or in

swallowing iced water, or when its torpor is induced by its catenation or association with other torpid parts, as in the commencement of intermittent fevers, and inoculated small-pox, that the subsequent action of the heart and arteries is generally increased, producing irritative fever. Which is owing to the accumulation of the sensorial power of irritation in one case, and of association in the other, contributing to actuate the next link of the catenated or associated motions. But when the torpor of the stomach is induced by previous exhaustion of its sensorial powers of irritation or of association by continued violent action, as by the stimulus of digitalis, or of contagious matter, or after intoxication from wine or opium, a weaker action of the heart and arteries succeeds, because there is no accumulation of sensorial power, and a deficient excitement of association. And finally, as this weak action of the heart and arteries is not induced by exhaustion of sensorial power, but by defect of the excitement of association, the accumulation of this power of association increases the action of the capillaries, and thus induces irritative fever.

7. When any part of the system acts very violently in fevers, the sensorial power of sensation is excited, which increases the actions of the moving system; whereas the pain, which arises from

from decreased irritative motions, as in hemcrania, seems to exhaust a quantity of sensorial power, without produoing or increasing any fibrous actions.

When the stomach is primarily affected, as in inirritative fevers from contagion, and in such a manner as to occasion pain, the action of the capillaries seems to be increased by this additional sensorial power of sensation, whence extensive inflammation or mortification ; but when the stomach and consequently the heart and arteries continue their torpidity of action ; as in confluent small-pox, and fatal scarlatina ; this constitutes sensitive inirritative fever, or typhus gravior.

But when the stomach is secondarily affected, if the sensorial power of senfation is excited, as in pleurisy or peripneumony, the actions of the heart and arteries are violently increased, and of all the moving system along with them. Thus the peripneumony is generally induced by the patient respiring very cold air, and this especially after being long confined to warm air, or after being much fatigued and heated by excessive labour or exercise. For we can cover the skin with more clothes, when we feel ourselves cold ; but the lungs not having the perception of cold, we do not think of covering them, nor have the power to cover them, if we desired it ; and the torpor thus produced is greater, or of longer duration, in proportion to the previous expenditure of sensorial power by heat or exercise.

This torpor of the lungs affects the skin with shuddering, and the stomach is also secondarily affected; next follows the violent action of the lungs from the accumulation of the power of irritation, and an inflammation of them follows this violent action. While the stomach recovers its activity by the increase of the excitement of the sensorial power of association, and along with it the heart and arteries, and the whole moving system. Hence this inflammation occurs during the hot fit of fever, and no cold fit succeeds, because the excess of the sensorial power of sensation prevents a succeeding torpor.

These new motions of certain parts of the system produce increased secretions of nutritious or organic mucus, which forms new vessels; these new vessels by their unusual motions produce new kinds of fluids; which are termed contagious, because they have the power, when introduced into a healthy body, of producing similar actions and effects, with or without fever, as in the small-pox and measles, or in the itch and venereal disease.

If any of these contagious matters affect the stomach with torpor either by their stimulus immediately applied, or by its sympathy with the parts first diseased, a fever is produced with sickness and want of appetite; as in small-pox, and scarlatina. If the stomach is not affected by contagious matter, no fever succeeds, as in itch, tinea, syphilis.

All these contagious matters are conceived to

be harmless, till they have been exposed to the air, either openly or through a moist membrane; from which they are believed to acquire oxygene, and thence to become some kinds of animal acids. As the preparations of mercury cure venereal ulcers; as a quarter of a grain of sublimate dissolved in wine, and given thrice a day; this effect seems to be produced either by its stimulating the absorbents in the ulcer to absorb the venereal matter before it has acquired oxygene; or by afterwards uniting with it chemically, and again depriving it of its acquired acidity. On either supposition it might probably be given with advantage in small-pox, and in all infectious diseases, both previous to their commencement, and during their whole progress.

8. The cold fits of intermittent fevers are caused by the torpor of some part owing to deficient irritation, and of the other parts of the system from deficient association. The hot fits are owing first to the accumulation of irritation in the part primarily affected; if it recovers its action, which does not always happen; and secondly to the accumulation of association in the other parts of the system, which during health are subject to perpetual action; and lastly also to the greater excitement of the power of association, when the part primarily affected recovers its irritability, and acts with greater energy than natural.

The deficient secretions in the cold fit depend on the torpor of the glandular system; and the increased secretions in the hot fit on their more energetic action. The thirst in the cold fit is owing to the deficient absorption from the skin, cellular membrane, and bladder; the thirst in the hot fit is owing to the too great dissipation of the aqueous part of the blood. The urine is pale and in small quantity in the cold fit from deficient secretion of it, and from deficient absorption of its aqueous parts; it is high coloured, and sometimes deposits a sediment, in the hot fit from the greater secretion of it in the kidneys, and the greater absorption of its aqueous and saline part in the bladder. The dryness and scurf on the tongue and nostrils are owing to the increased heat of the air expired from the lungs, and consequent greater evaporation of the aqueous part of the mucus. The sweats appear in consequence of the declension of the hot fit, owing to the absorbent vessels of the skin losing their increased action sooner than the secerning ones; and to the evaporation lessening as the skin becomes colder. The returns of the paroxysms are principally owing to the torpor of some less essential part of the system remaining after the termination of the last fit; and are also dependent on solar or lunar diurnal periods.

The torpor of the part, which induces the cold paroxysm, is owing to deficient irritation occasioned

fioned either by the subduction of the natural stimuli of food, or water, or pure air, or by deficiency of external influences, as of heat, or of solar or lunar gravitation. Or secondly, in consequence of the exhaustion of sensorial power by great previous exertions of some parts of the system, as of the limbs by great labour or exercise, or of the stomach by great stimulus, as by contagious matter swallowed with the saliva, or by much wine or opium previously taken into it. Or lastly a torpor of a part may be occasioned by some mechanic injury, as by a compression of the nerves of the part, or of their origin in the brain; as the sitting long with one leg crossed over the other occasions numbness, and as a torpor of the stomach with vomiting frequently precedes paralytic strokes of the limbs.

As sleep is produced, either by defect of stimulus, or by previous exhaustion of sensorial power; so the accumulation of the sensorial power of volition in those muscles and organs of sense, which are generally obedient to it, awakens the sleeping person; when it has increased the quantity of voluntariness so much as to overbalance the defect of stimulus in one case, and the exhaustion of sensorial power in the other; which latter requires a much longer time of sleep than the former. So the cold paroxysm of fever is produced either by defect of stimulus, or by previous exhaustion of the sensorial power

of some part of the system ; and the accumulation of the sensorial power of irritation in that part renews the action of it, when it has increased its irritability so much as to overbalance the defect of stimulus in one case, and the exhaustion of sensorial power in the other ; which latter requires a much longer torpor or cold fit than the former.

But in the cold paroxysm of fever, besides the torpor of one part of the system from defect of irritation, the remainder of it becomes torpid owing to defect of excitement of the sensorial power of association by the lessened action of the part first affected. This torpor of the general system remains, till the accumulation of the sensorial power of association has increased the associability so much as to overbalance the defect of the excitement of association ; then the torpor ceases, and if the first affected part has recovered its activity, the other parts are all thrown into excess of action by their increased associability, and the hot fit of fever is produced.

9. In the continued fevers with strong pulse the stomach is affected secondarily, and thus acts feebly from deficient excitement of the power of association ; but the accumulation of the power of association thus produced in an organ subject to perpetual and energetic action, is so great as to affect the next link of the associate train, which consists of the heart and arteries ; these therefore are exerted perpetually with increase of action.

In

In continued fevers with weak pulse the torpid stomach is affected primarily by previous exhaustion of its irritability by stimulus, as of contagious matter swallowed into it. The heart and arteries act feebly from deficient excitement of the power of association, owing to the torpor of the stomach, with which they are catenated; but the accumulation of the power of association, thus produced in organs subject to perpetual and energetic motion, is so great, as to affect the next link of the associate train; which consists of the capillaries of the skin or other glands; these therefore are exerted perpetually with great increase of action.

The continued fevers with strong pulse terminate by the reduction or exhaustion of the sensorial power by violent action of the whole system; which is followed either by return of health with the natural quantity of irritability, and of associability, or by a total destruction of them both, and consequent death.

In continued fevers with weak pulse the stomach remains torpid during the whole course of the fever; and at length by the recovery of its irritability and sensibility effects the cure of it. Which generally happens about the first, second, or third quarter of the lunar period, counted from the commencement of the disease, or continues a whole lunation, and sometimes more; which gave rise to what are termed critical days. See Sect. XXXVI. 4. on this subject. If the stomach

mach does not recover from its torpor, the patient becomes emaciated, and dies exhausted by the continuance of the increased action of the capillaries and absorbents, and the want of nourishment.

The cure of continued fever with weak pulse consists first in weakening the undue action of the capillaries of the skin by ablution with cold water from 32 to 80 degrees of heat; or by exposing them to cool air. Secondly, by invigorating the actions of the stomach, by decreasing them for a time, and thence accumulating the power of irritation, as by an emetic, or by iced water, or iced wine. Or by increase of stimulus, as by bark, wine, opium, and food, in small quantities frequently repeated. Or by renewing the action of the stomach by slight electric shocks. Or by fomenting it frequently with water heated to 96 or 100 degrees. Or lastly by exciting its power of association with other parts of the system, as by a blister; which succeeds best when the extremities are cool; or by swinging, as in vertigo rotatoria.

If by the stimulus of the Peruvian bark on the fibres of the stomach, they regain their due action, the heart and arteries also regain their due action; as their sensorial power of association is now excited, and expended as usual. And as there is then no accumulation of sensorial power in the heart and arteries, the capillaries cease to act with too great energy, and the fever is cured.

Thirdly.

Thirdly. If the heart and arteries could be themselves stimulated into greater action, although the stomach remained torpid, they might probably by expending a greater quantity of the sensorial power of irritation, prevent an accumulation of the sensorial power of association, (for these may possibly be only different modes of action of the spirit of animation,) and thus the too great action of the capillaries might be prevented and the fever cease. This new mode of cure might possibly be accomplished, if the patient was to breathe a gallon or two of pure or diluted oxygene gas frequently in a day; which by passing through the moist membranes of the lungs and uniting with the blood might render it more stimulant, and thus excite the heart and arteries into greater action.

Fourthly. Greater energy might probably be given to the whole system, and particularly to those parts which act too feebly in fevers, as the stomach and the heart and arteries, if the action of the secerning vessels of the brain could be increased in energy; this is probably one effect of all those drugs, which when given in large quantity induce intoxication, as wine and opium. And when given with great caution in small quantities uniformly repeated, as from three drops to five of the tincture of opium, but not more, every six hours, I believe they supply an efficacious medicine in fevers with great arterial debility; and the

the more so, if the Peruvian bark be exhibited alternately every six hours along with them. There are other means of exciting the vessels of the brain into action; as first by decreasing the stimulus of heat by temporary cold fomentation; secondly, increasing the stimulus of heat by long continued warm fomentation; thirdly, by electricity, as very small shocks passed through it in all directions; and lastly by blisters on the head. All those require to be used with great caution, and especially where there exists an evident stupor, as the removing of that is I believe frequently injurious. See stupor, Class I. 2. 5. 10.

The cure of fever with strong pulse consists in the repeated use of venefection, gentle cathartics, diluents; medicines producing sickness, as antimonials, digitalis; or the respiration of carbonated hydrogen; or by respiration of atmospheric air lowered by a mixture of hydrogen, azote, or carbonic acid gas, or by compressing the brain by whirling in a decumbent posture, as if lying across a horizontal mill-stone. See the former parts of this supplement for the methods of cure both of fevers with strong and weak pulse.

10. When any difficulty occurs in determining the weak pulse from the strong one, it may generally be assisted by counting its frequency. For when an adult patient lies horizontally in a cool room, and is not hurried or alarmed by the approach

proach of his physician, nor stimulated by wine or opium, the strong pulse seldom exceeds 118 or 120 in a minute; and the weak pulse is generally not much below 130, and often much above that number; except where a patient has naturally a pulse slower than usual in his healthy state. Secondly in fitting up in bed, or changing the horizontal to a perpendicular posture, the quickness of the weak pulse is liable immediately to increase 10 or 20 pulsations in a minute, which does not I believe occur in the strong pulse, when the patient has rested himself after the exertion of rising.

I shall here insert a remark on the general use of stimulating materials, whether medicinal or culinary, to counteract or prevent debility. When a stimulating material is exhibited, as the Peruvian bark, or opium, or wine; it should be continued but a certain time, as half a lunation, or a whole lunation. If the whole system be stimulated into increased exertion, as by wine or opium, there appears to be a temporary increased secretion of sensorial power in the brain, so long as this stimulus affects the system. If a part only of the system be stimulated, as by the exhibition of spices, essential oils, or bitter medicines, or metallic ones, then the stimulated organ has derived to it a greater quantity of sensorial power, or a greater secretion of it is produced in that part of the brain, where the stimulated nerves arise.

Which is probably owing to the sympathy of the stimulated extremity of every nerve, or its organ of sense, with the other extremity of it in the brain, in the same manner as when the excretory duct of a gland is stimulated, a greater secretion is produced in the body of it, as when the ducts of the lacrymal glands in the eyes, or of the salivary glands in the mouth are stimulated by dust or acrid materials.

Now if a stimulating medicine be given at certain intervals of time, as the Peruvian bark or wine in fevers, the increased action of a part or of the whole system soon becomes a link of the associated circle of diurnal actions, and may be said to become habitual.

The quantity of the stimulating medicine may then be diminished, and yet the increased activity of the system will continue; because the increased exertions are now produced partly by the sensorial power of association, as they are become a part of the diurnal circle of actions. And finally the stimulating medicine may be totally omitted, and yet the increased activity of the system continue for the same reason.

On this circumstance depends the power of the bitter medicines, as the bark, and other stimulating materials, as beer and wine, in preventing the returns of the cold paroxysms of fevers, and in strengthening the system, which increase of irritability, that is of strength, continues after the use of the medicine is withdrawn.

But

But on the contrary, if the stimulating material be continued much longer than one lunation, the whole system, or the stimulated organ alone, is excited into too forcible action by the two sensorial powers of irritation, and of association ; and consequently in process of time loses in some degree both its irritability and its associability ; and inactivity or torpor succeeds ; which constitutes weakness, as is seen in all those, who accustom themselves to dram-drinking.

Hence wine or opium, or Peruvian bark, may be continued twice or four times a day for half a lunation, or for a whole one with advantage in diseases of debility, for the purpose of gaining both diurnal and monthly associations of activity. But should not be much longer continued ; as a consequent debility will then be liable to succeed.

XVII. *Conclusion.*

Thus have I given an outline of what may be termed the sympathetic theory of fevers, to distinguish it from the mechanic theory of Boerhaave, the spasmodic theory of Hoffman and of Cullen, and the putrid theory of Pringle. What I have thus delivered, I beg to be considered rather as observations and conjectures, than as things explained and demonstrated ; to be considered as a foundation

foundation and a scaffolding, which may enable future industry to erect a solid and a beautiful edifice, eminent both for its simplicity and utility, as well as for the permanency of its materials,— which may not moulder, like the structures already erected, into the sand of which they were composed; but which may stand unimpaired, like the Newtonian philosophy, a rock amid the waste of ages!

LINES,

L I N E S,
TO BE PLACED AT THE END OF
Z O O N O M I A.
BY A FRIEND.

JAMQUE OPUS EXEGI.

The work is done!—nor Folly's active rage,
Nor Envy's self, shall blot the golden page;
Time shall admire, his mellowing touch employ,
And mend the immortal tablet, not destroy.

Z O O N O M I A E A U C T O R I
S. P. D.
A M I C U S.

CURRUS TRIUMPHALIS MEDICINÆ.

Currus it Hygeiæ, Medicus movet arma triumphans,
Undique victa fugit lurida turma mali.—
Laurea dum Phœbi viridis tua tempora cingit,
Nec mortale sonans Fama coronat opus;
Post equitat trepidans, repetitque Senectus in aurem,
Voce canens stridulæ, “ sis memor ipse mori !”

I N D E X
OF THE
C L A S S E S.

A.

ABORTION, i. 2. 1. 14.
..... from fear, iv. 3. 1. 7.
..... not from epilepsy, iii. 1. 1. 7.
..... not from hepatitis, ii. 1. 2. 12.
Absorption of solids, i. 2. 2. 14.
..... of matter, ii. 1. 6. 2. and 6.
..... cellular, iv. 1. 1. 6.
..... from the lungs, iv. 3. 1. 5. Suppl. i. 8. 6.
Abstinence of young ladies, ii. 2. 2. 1.
Accumulation of feces, ii. 2. 2. 7.
Acupuncture, iii. 1. 1. 8.
Adipfia, ii. 2. 2. 2.
Ægritudo ventriculi, i. 2. 4. 4.
..... See Sickness.
Agripnia. See Vigilia.
Ague-cakes, Suppl. i. 2. 3.
Alum in ulcers of the mouth, ii. 1. 3. 1. ii. 1. 6. 16.
Ambition, iii. 1. 2. 9.
Amaurosis, i. 2. 5. 5.
Anasarca of the lungs, i. 2. 3. 16.
Aneurisma, i. 2. 1. 18.
Anger, iii. 1. 2. 17.
..... tremor of, iv. 2. 3. 4.
..... blush of, iv. 2. 3. 5.
Angina. See Tonsillitis.
..... pectoris. See Asthma painful.
Anhelitus, ii. 1. 1. 4.

H h 2

Anhelatio

Anhelatio spasmodica, i. 3. 3. 3.
 Annulus repens, ii. 1. 5. 10.
 Anorexia, ii. 2. 2. 1.
 maniacalis, Suppl. i. 14. 3.
 epileptica, ii. 2. 2. 1. iii. 1. 1. 7.
 Apepsia, i. 3. 1. 3. Suppl. i. 8. 11.
 Aphtha, ii. 1. 3. 17.
 Apoplexy, iii. 2. 1. 16.
 Appetite defective, ii. 2. 2. 1.
 depraved, iii. 1. 2. 19.
 from abstinence, ii. 2. 2. 1.
 destroyed, iii. 1. 2. 20.
 from epilepsy, ii. 2. 2. 1.
 Arm, pain of, iv. 2. 2. 13.
 palsey of, iii. 2. 1. 4.
 Arsenic in tooth-ach, i. 2. 4. 12.
 in head-ach, i. 2. 4. 11.
 Arthrocele, ii. 1. 4. 17.
 Arthropoisis, ii. 1. 4. 18.
 Arthritis. See Gout.
 Ascarides, i. 1. 4. 12. iv. 1. 2. 9. iv. 2. 2. 6.
 Ascites, i. 2. 3. 13.
 Associations affected four ways, iv. 1. 1. G.
 how produced, iv. 1. 1. H.
 distinct from catenations, iv. 1. 1. A.
 Associations, three kinds of, iv. 1. 1. B.
 tertian, iv. 1. 1. K.
 of the fauces and pubis, iv. 1. 2. 7.
 sensitive, a law of, iv. 2. 2. 2.
 sensitive, iv. 2. 1.
 accumulates, Suppl. i. 8. 3. i. 11. 4.
 Asthma humorai, ii. 1. 1. 8. i. 3. 2. 8.
 of infants, i. 1. 3. 4.
 convulsive, iii. 1. 1. 10.
 painful, iii. 1. 1. 11.
 Auditus acrior, i. 1. 5. 2.
 imminutus, i. 2. 5. 6.
 Azote, Suppl. i. 9. 3. i. 11. 4.
 sceptic. ii. 1. 6. 6.

B.

Bandages, ill effect of, ii. 1. 1. 12.
 promote absorption, i. 1. 3. 13.

Bandages

Bandages in gout, iv. 1. 2. 15.
 in rheumatism, iv. 1. 2. 16.
 in hemicrania, iv. 2. 2. 8.
 in epilepsy, iii. 1. 1. 7.
 Bath, cold, i. 2. 2. 1. Suppl. 1. 14. 3.
 warm, i. 1. 2. 3.
 Beauty, iii. 1. 2. 4.
 loss of, iii. 1. 2. 12.
 Bile-duct, pain of, iv. 2. 2. 4.
 Bile crystallized, i. 1. 3. 8.
 Bitter taste, i. 1. 3. 1.
 not from bile, i. 1. 3. 1.
 Bleeding. See Hæmorrhage.
 Bladder, distention of, ii. 2. 2. 6.
 stone of, i. 1. 3. 10.
 catarrh of, ii. 1. 4. 11.
 Blindness, i. 2. 5. 5.
 Blush of anger, iv. 2. 3. 5. Suppl. i. 12. 7.
 of guilt, iv. 2. 3. 6. Suppl. i. 12. 7.
 Bones, innutrition of, i. 2. 2. 14.
 caries of, ii. 1. 4. 19.
 Borborigmus, i. 3. 1. 9.
 Bougies, ii. 1. 4. 11.
 Bowels, gurgling of, i. 3. 1. 9.
 Brachiorum paralysis, iii. 2. 1. 4.
 Brain stimulated, Suppl. i. 16. 9.
 Bronchocele, i. 2. 3. 20.
 Broth, i. 2. 4. 8.
 Burns, i. 1. 3. 13.
 Butterflies, experiment on, i. 1. 2. 3.
 Buxton bath feels warm, Suppl. i. 16.

C.

Cacofitia, iii. 1. 2. 20.
 Calculi productio, i. 1. 3. 9. ii. 1. 2. 14.
 renis, i. 1. 3. 9. iv. 2. 3. 3.
 vesicæ, i. 1. 3. 10. iv. 2. 2. 2.
 Calico shirts, i. 1. 2. 3.
 Callus, i. 2. 2. 12.
 Canities. See Hair grey.
 Calor febrilis, i. 1. 2. 1.
 Calves fed on gruel, i. 1. 2. 5.
 hydatides of, i. 2. 5. 4.

Cancer, ii. 1. 4. 16. ii. 1. 6. 13.
 Cantharides, large dose of, iv. 2. 2. 2.
 Carbonic acid gas, Suppl. i. 9. 3.
 Cardialgia, i. 2. 4. 5.
 Carcinoma, ii. 1. 4. 16. ii. 1. 6. 13.
 Caries ossium, ii. 1. 4. 19.
 Cataract, i. 2. 2. 13.
 Catarrh, warm, i. 1. 2. 7.
 cold, i. 2. 3. 3.
 lymphatic, i. 3. 2. 1.
 sensitive, ii. 1. 2. 5.
 epidemic, ii. 1. 3. 6.
 of dogs and horses, ii. 1. 3. 6.
 from cold skin, iv. 1. 1. 5.
 periodic, iv. 3. 4. 1.
 Catamenia, i. 2. 1. 10. iv. 2. 4. 7.
 Catalepsis, iii. 2. 1. 9.
 Cats, mumps of, ii. 1. 3. 4.
 Cephalæa sympathetica, iv. 2. 2. 7.
 idiopathica, i. 2. 4. 11.
 somniosa, i. 2. 4. 11.
 Celarian operation, i. 2. 2. 14.
 Charcoal tooth-powder, i. 2. 4. 12.
 Cheek, torpor of, iv. 2. 2. 1.
 Chicken-pox, ii. 1. 3. 15.
 Chin-cough, ii. 1. 3. 8.
 Child-bed fever, ii. 1. 6. 16.
 Children, new-born, ii. 1. 1. 12.
 gripes and purging of, i. 1. 2. 5.
 Chlorosis, i. 2. 3. 10. Suppl. i. 8. 11.
 Chorea St. Viti, iv. 2. 3. 2.
 Citta, iii. 1. 2. 19.
 Clamor, iii. 1. 1. 3.
 Clavicular animals, ii. 1. 2. 6.
 Clavus hystericus, iv. 2. 2. 8.
 Claudicatio coxaria, i. 2. 2. 17.
 Cold in the head. See Catarrh.
 Cold air in fevers, iii. 2. 1. 12. iv. 2. 4. 11.
 effects of, iii. 2. 1. 17.
 how to be used, iv. 1. 1. 4.
 death from, iii. 2. 1. 17.
 Colic, flatulent, i. 2. 4. 7.
 from lead, i. 2. 4. 8.
 hysterick, i. 2. 4. 7. iii. 1. 1. 8.

Compassion,

Compassion, iii. 1. 2. 24.
 Consumption, ii. 1. 6. 7.
 Convulsion, iii. 1. 1. 5.
 weak, iii. 1. 1. 5.
 from bad air, iii. 1. 1. 5.
 painful, iii. 1. 1. 6. iv. 2. 4. 5.
 Consternation, i. 1. 5. 12.
 Constipation, i. 1. 3. 5. ii. 2. 1. 7.
 Contagious matter of two kinds, ii. 1. 3.
 is oxygenated, ii. 1. 5.
 produces fever, how, Suppl. i. 16. 7.
 destroyed by nitrous vapour, ii. 1. 3.
 by sulphurous vapour, ii. 1. 3.
 Cornea to perforate, i. 1. 3. 14.
 scars of seen on milk, i. 1. 3. 14.
 Corpulency, i. 2. 3. 17.
 Coryza. See Catarrh.
 Costiveness, i. 1. 3. 5. ii. 2. 1. 7.
 Cough of drunkards, ii. 1. 1. 5.
 hooping, ii. 1. 3. 8.
 hepatic, iv. 2. 1. 8.
 gouty, iv. 2. 1. 9.
 periodic, iv. 2. 4. 6. iv. 3. 4. 2.
 from cold feet, iv. 2. 1. 7.
 Cows, pestilence of, ii. 1. 3. 13.
 bloody urine of, ii. 1. 3. 13.
 swelled by clover, ii. 1. 7.
 Cow-pox, ii. 1. 3. 9.
 Crab-lice, i. 1. 4. 14.
 Cramp, iii. 1. 1. 13.
 painful, iii. 1. 1. 14.
 in diarrhoea, iv. 1. 2. 10.
 Crapula ventriculi, ii. 1. 1. 7.
 Credulity, iii. 2. 2. 4.
 Crines novi, i. 1. 2. 15.
 Croup, i. 1. 3. 4. ii. 1. 2. 4. ii. 1. 3. 3.
 Crusta lactea, ii. 1. 5. 12.
 Cutis arida, i. 1. 3. 6.
 Cynanche. See Tonfillitis.
 parotidæa. See Parotitis.

D.

Darkness in fevers, i. 2. 5. 3.
 Deafness, two kinds of, i. 2. 5. 6.

Debility, three kinds of, i. 2. 1.
 Debility and strength metaphors, i. 2. 1.
 Decussation of nerves, iii. 2. 1. 10.
 Deglutition, ii. 1. 1. 1.
 involuntary, iv. 1. 3. 1.
 Delirium febrile, ii. 1. 7. 1.
 of drunkenness, ii. 1. 7. 3.
 maniacal, ii. 1. 7. 2.
 in parotitis, iv. 2. 1. 19.
 Dentition, i. 1. 4. 5.
 Dentium dolor a stridore, iv. 1. 2. 3.
 Descent of the uterus, i. 1. 4. 8.
 Diabetes, i. 3. 2. 6.
 foul tongue in, i. 1. 3. 1.
 irritative, iv. 3. 1. 1.
 from fear, iv. 3. 1. 3.
 Diarrhoea warm, i. 1. 2. 5.
 of infants, i. 1. 2. 5.
 lymphatic, i. 3. 2. 4.
 chyliferous, i. 3. 2. 5.
 cold, i. 2. 3. 6.
 rheumatic, iv. 2. 1. 16.
 from fear, iv. 3. 1. 4.
 from toothing, iv. 2. 2. 14.
 in fevers, Suppl. i. 2. 4.
 cure of, iv. i. 1. F.
 Digestion increased by cold, iv. 1. 1. 4.
 decreased by cold, iv. 1. 2. 5.
 Digitalis in rheumatism, iv. 1. 2. 16.
 Diluents, use of, ii. 1. 2. 1.
 Distention of the nipples, ii. 1. 7. 10. iv. 1. 2. 7.
 Diuretics useless in dropfy, i. 1. 3. 7.
 Dizziness See Vertigo.
 Dogs, catarrh of, ii. 1. 3. 6.
 Dolor digiti sympathet. iv. 2. 2. 12.
 ductus choledochi, iv. 2. 2. 4.
 humeri in hepatidite, iv. 2. 2. 9.
 pharyngis ab acido, iv. 2. 2. 5.
 testium nephriticus, iv. 2. 2. 11.
 urens, i. 1. 5. 10.
 Dracunculus, i. 1. 4. 13.
 Dreams, ii. 1. 7. 4.
 Dropfy of the brain, i. 2. 3. 12.
 of the belly, i. 2. 3. 13.
 of the chest, i. 2. 3. 14.

Dropfy

Dropfy of the ovary, i. 2. 3. 15.
 of the lungs, i. 2. 3. 16.
 of the scrotum, i. 2. 3. 16.
 Dysentery, ii. 1. 3. 18.
 Dysmenorrhagia, i. 2. 1. 12.
 Dyspepsia, i. 3. 1. 3.
 a frigore, iv. 2. 1. 6.
 Dyspnoea from cold bath, iv. 2. 1. 5.
 rheumatica, iv. 2. 1. 16.
 Dysuria insensitiva, ii. 2. 2. 6.
 paralytica, iii. 2. 1. 6.

E.

Ears, discharge behind, i. 1. 2. 9.
 noise in them, iv. 2. 1. 15.
 Ear-ach, iv. 2. 2. 8.
 Ebrietas, i. 1. 1. 2.
 Education, iii. 2. 1. 8. iii. 1. 2. 24. iii. 1. 2. 11.
 heroic, iii. 1. 2. 25.
 Egg boil'd for inflamed-eyes, ii. 1. 4. 1.
 ... boiled soonest, Suppl. i. 7.
 ... life of, iv. 1. 4. 1.
 Electric shocks, iv. 1. 4. 5.
 in paralyfis, iii. 2. 1. 10.
 in scrophula, i. 2. 3. 21.
 in hoarseness, iii. 2. 1. 5.
 Electrized zinc and silver, i. 2. 5. 5. iv. 2. 1. 11.
 Empyema, ii. 1. 6. 4.
 Ennui, iii. 1. 2. 11. iii. 2. 1. 8.
 Enteralgia rheumatica, iv. 1. 2. 16.
 Enteritis, ii. 1. 2. 11.
 superficialis, ii. 1. 3. 20.
 Epilepsy, iii. 1. 1. 7. iv. 1. 6.
 painful, iii. 1. 1. 8. iv. 2. 4. 4.
 terminates with sleep, iii. 1. 1.
 in parturition, iii. 1. 1. 7.
 with digestion, ii. 2. 2. 1.
 Epistaxis. See Hæmorrhagia.
 Epoulosis. See Cicatrix.
 Erotomania, iii. 1. 2. 4.
 Euæsthesia, voluntary, iv. 3. 3. 3.
 Eruption of small-pox, iv. 2. 1. 12. iv. 2. 2. 10.
 Erysipelas, iv. 1. 2. 17. ii. 1. 3. 2. iv. 2. 4. 10.
Erysipelas

INDEX OF

Erysipelas seldom suppurates, why, ii. 1. 3. 2.
 Esuries, i. 2. 4. 2.
 Ether, to purify, i. 2. 5. 6.
 Evil, i. 2. 3. 21.
 Expectoration, warm, i. 1. 2. 8.
 solid, i. 1. 3. 4.
 cold, i. 2. 3. 4.
 Exudation behind the ears, i. 1. 2. 9.
 Eyes, blue under the, i. 2. 2. 2. ii. 1. 4. 4.
 Eye-wing, ii. 1. 4. 2.
 Eye-lids, red, ii. 1. 4. 3.
 Eyelid inverted, cure of, ii. 1. 1. 8.
 coloured with antimony, ii. 1. 4. 3.
 Excoriations, iii. 2. 1. 10.

F.

Face, pimpled, ii. 1. 4. 6.
 red after meals, Suppl. i. 12. 7.
 flushed after dinner, iv. 1. 1. 1.
 Fat people why short breathed, ii. 1. 1. 4.
 how to reduce, i. 2. 3. 17.
 Fear, syncope from, i. 2. 1. 4.
 abortion from, iv. 1. 3. 7.
 produces absorption, ii. 1. 6. 4.
 paleness in, iv. 1. 3. 5.
 of death, iii. 1. 2. 14.
 of hell, iii. 1. 2. 15.
 of poverty, iii. 1. 2. 13.
 Feet cold produces heartburn. Suppl. i. 8. 5.
 fetid, i. 1. 2. 14.
 cold in small-pox, iv. 2. 2. 10.
 Fevers, five kinds, ii. 1. 2. Suppl. i. 1. 2.
 irritative, i. 1. 1. 1. iv. 1. 1. 8.
 inirritative, i. 2. 1. 1. iv. 2. 1. 19. Suppl. i. 1. 2.
 sensitive, ii. 1. 5. 1.
 sensitive irritated, ii. 1. 2. 1.
 sensitive inirritated, ii. 1. 3. 1.
 intermit, why, Suppl. i.
 continue, why, Suppl. i.
 periods of, iv. 2. 4. 11.
 simple, Suppl. i. 1.
 compound, Suppl. i. 2.
 termination of cold fit, Suppl. i. 3.

Fever,

Fever, return of cold fit, Suppl. i. 3.
 sensation in, Suppl. i. 5.
 circles of motions in, Suppl. i. 6.
 cold and hot fits, Suppl. i. 7.
 continued, Suppl. i. 8.
 torpor of lungs in, Suppl. i. 9. 1.
 hot determinable in cold fit, i. 1. 1. 1.
 frequency of pulse in, i. 1. 1. 1.
 not an effort to cure, i. 1. 2. 3.
 from enclosed matter, ii. 1. 6. 2.
 from aerated matter, ii. 1. 6. 6.
 from contagious matter, ii 1. 6. 11.
 from contagious fancies, ii 1. 6. 15.
 puerperal, ii. 1. 6. 16.
 torpor of the stomach in, Suppl. i. 12.
 cause of, Suppl. i. 13.
 termination of, Suppl. i. 14.
 inflammation excited in, Suppl. i. 15.
 returns of, Suppl. i. 4.
 when cold air in, Suppl. i. 2. 2.
 sympathetic, theory of, Suppl. i.
 duration of explained, Suppl. i. 2. 5.
Fingers, playing with, iv. 1. 3. 4.
 pain of, iv. 2. 2. 12.
Fire, animal, iv. 1. 4. 5.
Fish live longer with injured brain, i. 2. 5. 10.
Fistula in ano, ii. 1. 4. 10.
 lacrymalis, ii 1. 4. 9.
 in urethra, ii. 1. 4. 11.
Flannel shirt in diarrhoea, iv. 1. 1. 3.
 injurious in summer, i. 1. 2. 3.
Fluor albus warm, i. 1. 2. 11.
 cold, i. 2. 3. 7.
Frigus febrile, i. 2. 2. 1.
 chronicum, i. 2. 2. 2.
 lethale, iii. 2. 1. 17.

G.

Galvanism, i. 2. 5. 5. iv. 2. 1. 11.
Gall-stone, i. 1. 3. 8.
Gangreen, ii. 1. 6. 17.
Gargles, ii. 1. 3. 3.
Gastritis, ii. 1. 2. 10.

Gastritis

Gastritis superficialis, ii. 1. 3. 19.
 Genu tumor albus, i. 2. 3. 19.
 Gleet. See Gonorrhœa.
 Globus hystericus, i. 3. 1. 7.
 Gonorrhœa warm, i. 1. 2. 10.
 cold, i. 2. 3. 8.
 vénereal, ii. 1. 5. 1.
 Gout, iv. 1. 2. 15. iv. 2. 4. 9.
 of the liver, ii. 1. 1. 7.
 cases of, iv. 1. 2. 15.
 cough, iv. 2. 1. 9.
 of the stomach, i. 2. 4. 6.
 hæmorrhage in, i. 1. 1. 4.
 Grace defined, iii. 1. 2. 4.
 Gravel distinguished from salts, i. 1. 3. 9.
 Gravitation, iv. 2. 4.
 Green-sickness. See Chlorosis.
 Grief, iii. 1. 2. 10.
 Gripes of children, i. 1. 2. 5. iv. 2. 1. 3.
 Gustus acrior, i. 1. 5. 4.
 immisautus, i. 2. 5. 8.
 Gum, red, i. 1. 2. 3. ii. 1. 3. 12.
 Gutta rosea, ii. 1. 4. 6. iv. 1. 2. 13. and 14.
 ferena, i. 2. 5. 5.

H.

Hæmorrhage arterial, i. 1. 1. 3.
 of the lungs, i. 1. 1. 4.
 of the nose, i. 1. 1. 5.
 vénous, i. 2. 1. 5.
 of the rectum, i. 2. 1. 6.
 of the kidneys, i. 2. 1. 7.
 of the liver, i. 2. 1. 8.
 Hæmoptoe arterial, i. 1. 1. 4.
 venous, i. 2. 1. 9.
 Hæmorrhoids cruenta, i. 2. 1. 6. iv. 2. 4. 8.
 alba, i. 1. 2. 12.
 Hair, grey, i. 2. 2. 11.
 new, i. 1. 2. 15.
 white by uterine pressure, i. 2. 2. 11.
 Hallucination of sight, ii. 1. 7. 5.
 of hearing, ii. 1. 7. 6.
 maniacal, iii. 1. 2. 1.

Hallucinatio

Hallucinatio studiosa, iii. 1. 2. 2.
 Harrogate water, factitious, i. 1. 4. 12.
 Head-ach. See Hemicrania, and Cephalæa.
 Hearing, acuter, i. 1. 5. 2.
 diminished, i. 2. 5. 6.
 Heart-burn, i. 2. 4. 5.
 Heart stimulated, Suppl. i. 11. 7. i. 16. 9.
 Heat, animal, i. 1. 2. 1. i. 1. 2. 3.
 sense of acuter, i. 1. 5. 6.
 elemental, iv. 2. 4.
 hectic lessened by swinging, iv. 2. 1. 10.
 not perceived by the lungs, iii. 1. 1. 10.
 not estimated by thermometers, Suppl. i. 7.
 of the breath, Suppl. i. 2. 2.
 Hemicrania idiopathica, i. 2. 4. 12.
 sympathetica, iv. 2. 2. 8. iv. 2. 4. 3. Suppl.
 i. 14. 3.
 relieved by mercury, iv. 2. 2. 8.
 Hemiplegia, iii. 2. 1. 10.
 Hepatis tumor, i. 2. 3. 9.
 Hepatitis, ii. 1. 2. 12.
 chronica, ii. 1. 4. 12.
 Herpes, ii. 1. 5. 8.
 nephritica, iv. 1. 2. 11.
 Hiccough, ii. 1. 1. 6. iv. 1. 1. 7.
 Hip-joint injured, i. 2. 2. 17.
 Hoarseness, ii. 1. 3. 5. iii. 2. 1. 4.
 Hordeolum, ii. 1. 4. 4.
 Hooping-cough, ii. 1. 3. 8.
 Horses, broken wind of, i. 2. 4. 9.
 catarrh of, ii. 1. 3. 6.
 Humectation of the body, iv. 1. 4. 7.
 Hunger, i. 2. 4. 2.
 Hydatides in calves, i. 2. 5. 4.
 Hydrocele, i. 2. 3. 11.
 Hydrocephalus inter. i. 2. 3. 12. i. 2. 5. 4. iii. 2. 1. 10.
 from inflammation, i. 2. 3. 12.
 Hydrogene gas, Suppl. i. 9. 3. i. 11. 4.
 in fevers, Suppl. i. 11. 6. i. 16. 9.
 Hydrothorax, i. 2. 3. 14. case of, iv. 2. 2. 13.
 Hydro-carbonate gas, Suppl. i. 9. 1. Suppl. i. 15. 3.
 Hydrops ovarii, i. 2. 3. 15.
 Hydrophobia, i. 3. 1. 11. iii. 1. 1. 15. iv. 1. 2. 7. iv.
 2. 4. 11.

Hypochondriasis,

Hypochondriasis, i. 2. 4. 16.
 Hysteralgia frigida, i. 2. 4. 17.
 Hysteria, i. 3. 1. 10. Suppl. i. 8. 11.
 from fear, iv. 3. 1. 8.
 from cold, iv. 3. 3. 3.
 convulsions in, iii. 1. 1. 5.
 laughter in, iii. 1. 1. 5.
 Hysteritis, ii. 1. 2. 16.

I.

Jactitatio, iii. 1. 1. 1.
 Jaundice, i. 1. 3. 8. i. 2. 4. 19.
 Icterus, i. 1. 3. 8. i. 2. 4. 19.
 Ileus, i. 3. 1. 6. ii. 1. 2. 11.
 Impotentia, ii. 2. 2. 3.
 Indigestion, i. 3. 1. 3.
 See Anorexia and Apepsia.
 from cold feet, iv. 2. 1. 6. Sup. i. 8. 5.
 Incubus, iii. 2. 1. 13.
 Infants, green stools of, i. 1. 2. 5.
 new born, ii. 1. 1. 13.
 Inflammation of the eye, ii. 1. 2. 2.
 superficial, ii. 1. 4. 1.
 of the brain, ii. 1. 2. 3.
 of the lungs, ii. 1. 2. 4.
 superficial, ii. 1. 3. 7.
 of the pleura, ii. 1. 2. 5.
 of the diaphragm, ii. 1. 2. 6.
 of the heart, ii. 1. 2. 7.
 of the peritoneum, ii. 1. 2. 8.
 of the mesentery, ii. 1. 2. 9.
 of the stomach, ii. 1. 2. 10.
 superficial, ii. 1. 3. 19.
 of the bowels, ii. 1. 2. 11.
 superficial, ii. 1. 3. 20.
 of the liver, ii. 1. 2. 12.
 chronic, ii. 1. 4. 12.
 of the spleen, ii. 1. 2. 13. Sup. i. 16. 6.
 of the kidneys, ii. 1. 2. 14.
 of the bladder, ii. 1. 2. 15.
 of the womb, ii. 1. 2. 16.
 of the tonsils, ii. 1. 3. 3.
 of the parotis, ii. 1. 3. 4.

Inirritability of lacteals, i. 2. 3. 26.
 of lymphatics, i. 2. 3. 27.
 of the gall-bladder, i. 2. 4. 19.
 of the kidney, i. 2. 4. 20.
 of the spleen, Sup. i. 16. 6.
 vicissitudes of, i. 1. 1.
 Innutrition of bones, i. 2. 2. 14.
 Inoculation, ii. 1. 3. 9.
 Insanity, quick pulse in, iii. 1. 1.
 from parturition, iii. 1. 2.
 from paralysis, iii. 1. 2.
 with fever, iii. 1. 2.
 cure of, iii. 1. 2.
 confinément in, iii. 1. 2.
 cures other diseases, i. 2. 3. 16.
 Insensibility, ii. 2. 1. 1.
 Introsusception of the intestine, i. 3. 1. 6.
 Ira, iii. 1. 2. 17.
 Ichias, ii. 1. 2. 18. i. 2. 4. 15.
 Issues, use of, i. 1. 2. 9. iii. 1. 1. 11.
 Itch, ii. 1. 5. 6.
 Itching, i. 1. 5. 9.
 of the nose, iv. 2. 2. 6.

K.

Kangaroo, i. 2. 2. 14.

L.

Labour, difficult, i. 2. 2. 14
 Lacrymarum fluxus sym. iv. 1. 2. 1.
 Lameness of the hip, i. 2. 2. 17.
 Lassitude, iii. 2. 1. 1.
 Laughter, iv. 2. 3. 3. iii. 1. 1. 4. iv. 1. 3. 3.
 See Ritus.
 Lead, pernicious, i. 2. 4. 8.
 Leg, one shorter, i. 2. 2. 17.
 Lepra, ii. 1. 5. 3.
 Lethargus, iii. 2. 1. 14.
 Lethi timor, iii. 1. 2. 14.
 Lice, i. 1. 4. 15.
 Lientery, i. 2. 3. 6.
 Life of an egg, iv. 1. 4. 1.
 of winter-sleepers, iv. 1. 4. 2.

Light

Light debilitates in fevers, i. 2. 5. 3.
 Lingua arida, i. i. 3. i. iv. 2. 4. 11.
 Liver, torpor of, i. 2. 2. 6.
 tumor of, i. 2. 3. 9.
 inflamed, ii. i. 2. 12.
 Lochia nismia, i. 2.
 Locked jaw, iii. i. i. 13.
 Love, sentimental, iii. i. 2. 4.
 Lues venerea, ii. i. 5. 8.
 imaginaria, iii. i. 2. 24.
 Lumbago, ii. i. 2. 17. iii. i. i. 1.
 cold, i. 2. 4. 16.
 Lumbricus, i. i. 4. 10.
 Lunar influence on the solids, i. 2. i. 11.
 Lungs, adhesions of, ii. i. 2. 5.
 not sensible to heat, iii. i. i. 10.
 Lusus digitorum invitus, iv. i. 3. 4.

M.

Maculæ vultus, i. 2. i. 9.
 Madness, mutable, iii. i. 2. i.
 Magnetic fluid, iv. i. 4. 5.
 Mammarum tumor, iv. 2. i. 19.
 Mammularum tensio, iv. 2. i. 6. i. i. 4. 7.
 Mania mutabilis, iii. i. 2. i.
 Matter, variolous, ii. i. 3. 9.
 contagious, ii. i. 3. ii. i. 6. 11.
 enclosed, ii. i. 6. 11.
 oxygenated, ii. i. 6. 6.
 fanious, ii. i. 6. 15.
 Measles, ii. i. 3. 10. Suppl. i. 16. 6.
 Membranes, what, iv. i. 2.
 Menorrhagia, i. 2. i. 11.
 Mercury crude, as a clyster, i. 3. i. 6.
 in colic from lead, i. 2. 4. 8.
 in all contagions, Suppl. i. 16. 7.
 in vertigo, iv. i. 2. 11.
 Miliaria, ii. i. 3. 12.
 Milk new, for children, i. i. 2. 5.
 old, induces constiveness, ii. 2. 2. 7.
 Milk-crust, ii. i. 5. 12.
 Miscarriage. See Abortion.
 Mæror, iii. i. 2. 10.
 Mobility, iv. i. 2.

Mobility of the skin, Suppl. i. 7.
 Mollities ossium, i. 2. 2. 14.
 Moon, effect of, iv. 2. 4.
 Morbilli. See Rubeola.
 Mortification, ii. 1. 6. 17. iii. 2. 1. 10.
 Morpiones, i. 1. 4. 14.
 Mucus diminished, i. 2. 2. 4.
 of the throat cold, i. 2. 3. 1.
 of the bowels, i. 2. 3. 6. i. 1. 2. 12.
 of the lungs, i. 1. 3. 4.
 forms stones, i. 1. 3. 9.
 distinguished from pus, ii. 1. 6. 6.
 Mumps, ii. 1. 3. 4.
 Murmur aurium, iv. 2. 1. 15.
 Muscæ volitantes, i. 2. 5. 3.

N.

Nails, biting of, iv. 1. 3. 5.
 Nares aridi, i. 1. 3. 3.
 Nausea, dry, i. 2. 4. 3.
 humid, i. 3. 2. 3.
 ideal, iv. 3. 2. 1.
 from conception, iv. 3. 2. 2.
 Navel-string of infants, ii. 1. 1. 12.
 cut too soon, ii. 1. 1. 12.
 Neck thickens at puberty, iv. 1. 2. 7.
 Neck-swing, i. 2. 2. 16.
 Necrosis ossium, ii. 1. 4. 19.
 Nephritis, ii. 1. 2. 14. i. 1. 3. 9. iii. 2. 1. 14.
 Nerves decussate, iii. 2. 1. 10.
 Nicitation irritative, i. 1. 4. 1.
 sensitive, ii. 1. 1. 9.
 involuntary, iv. 1. 3. 2.
 Night-mare, iii. 2. 1. 13.
 Nipples, tension of, i. 1. 4. 7. iv. 2. 1. 6.
 want of, ii. 1. 1. 13.
 Nostalgia, iii. 1. 2. 6.
 Nostrils, dry, i. 1. 3. 3.

O.

Obesitas, i. 2. 3. 17.
 Odontalgia, i. 2. 4. 13.
 Odontitis, ii. 1. 4. 7.

Øsophagi scirrhus, i. 2. 3. 25.
 Olfactus acrior, i. 1. 5. 3.
 imminutus, i. 2. 5. 7.
 Oil destroys insects, i. I. 4. 14.
 ... essential of animals, i. I. 2. 14.
 ... why injurious in erysipelas, ii. I. 3. 2
 Ophthalmia, internal, ii. I. 2. 2.
 superficial, ii. I. 4. 1.
 Opium in catarrh, i. 2. 3. 3.
 in diaphragmitis, ii. I. 2. 6.
 Orci timor, iii. I. 2. 15.
 Oscitatio, ii. I. I. 10.
 Ossium innutritio, i. 2. 2. 14.
 Otagia, i. 2. 4. 13. iv. 2. 2. 8.
 Otitis, ii. I. 4. 8.
 Otopuosis, ii. I. 4. 8.
 Ovary, dropfy of, i. 2. 3. 15.
 exsection of, i. 2. 3. 15.
 Oxygen gas, Suppl. i. 9. 3.
 in fevers, Suppl. i. 11. 7. i. 16. 9.
 Oxygenation of blood, iv. I. 4. 6.

P.

Pain exhausts sensorial power, iv. 2. 2.
 greater prevents less, iv. 2. 2. 2.
 nervous, i. 2. 4.
 of the little finger, symptom, iv. 2. 2. 12.
 of arm in hydrothorax, iv. 2. 2. 13.
 of the bile-duct, iv. 2. 2. 4.
 of the shoulder, iv. 2. 2. 9.
 of the pharynx, iv. 2. 2. 5.
 of the testis, iv. 2. 2. 11.
 smarting, i. 1. 5. 10.
 of the side, i. 2. 4. 14; iv. 1. 2. 16.
 of menstruation, i. 2. 1. 12.
 use of, iii. 1. 1. 11. 1. 1. 2. 9.
 of the uterus, i. 2. 4. 17.
 Paint, white, dangerous, ii. 1. 4. 6
 Palate, defect of, i. 2. 2. 20.
 Paleness, i. 2. 2. 2.
 from fear, iv. 3. 1. 5.
 from sickness, iv. 2. 1. 4.
 of urine after dinner, iv. 2. 1. 2.
 Paleness

Paleness from cold skin, iv. 2. 1. 1.
 Palpitation of heart, i. 3. 3. 2. i. 2. 1. 10.
 from fear, iv. 3. 1. 6.
 relieved by arsenic, iv. 2. 1. 18.
 Pancreas, torpor of, i. 2. 2. 7.
 Pandiculatio, ii. 1. 1. 10.
 Panting, ii. 1. 1. 4. i. 3. 3. 3.
 Paracentesis at the navel, i. 2. 3. 13.
 Paralysis, iii. 2. 1. 10.
 of the bladder, iii. 2. 1. 6.
 of the rectum, iii. 2. 1. 7.
 of the hands, iii. 2. 1. 4.
 cure of, iii. 2. 1. 4.
 Paraplegia, iii. 2. 1. 11.
 Paresis inirritativa, i. 2. 1. 2. Suppl. i. 3. 10.
 sensitiva, i. 2. 1. 3.
 voluntaria, iii. 2. 1. 8.
 Paronychia, internal, ii. 1. 2. 19.
 superficial, ii. 1. 4. 5.
 Parotitis, ii. 1. 3. 4.
 Parturition, ii. 1. 1. 13. ii. 1. 2. 16.
 more fatal in high life, ii. 1. 1. 13.
 with convulsion, iii. 1. 1. iii. 1. 1. 7.
 difficult, i. 2. 2. 14.
 Passions depressing and exciting, iv. 3. 1. 5.
 Paupertatis timor, iii. 1. 2. 13.
 Pediculus, i. 1. 4. 15.
 Pemphigus, ii. 1. 3. 14.
 Penetration of animal bodies, iv. 1. 4. 7.
 Peripneumony, ii. 1. 2. 4.
 tracheal, ii. 1. 2. 4.
 superficial, ii. 1. 3. 7.
 inirritated, ii. 1. 2. 4.
 Peritonitis, ii. 1. 2. 8.
 Perspiration not an excrement, i. 1. 2. 14.
 greatest in the hot fit, i. 1. 2. 3.
 fetid, i. 1. 2. 14.
 Pertussis, ii. 1. 3. 8.
 Pestis, ii. 1. 3. 13.
 Petechiae, i. 2. 1. 17.
 cure of, Suppl. i. 2. 7.
 Pharynx, pain of, iv. 2. 2. 5.
 Phosphorus, ii. 2. 2. 3.
 Phrenitis, ii. 1. 2. 3.

I i 2

Phthisis,

Phthisis, pulmonary, ii. 1. 6. 7.
 Piles, bleeding, i. 2. 1. 6.
 white, i. 1. 2. 12.
 Pimples on the face, ii. 1. 4. 6.
 Pins swallowed, ii. 1. 1. 7.
 Placenta, ii. 1. 1. 12. ii. 1. 2. 16.
 Plague, ii. 1. 3. 13.
 Plasters, why moist, i. 1. 3. 6.
 Pleurisy, ii. 1. 2. 5.
 Pleurodyne chronica, i. 2. 4. 14.
 rheumatica, iv. 1. 2. 16.
 Pedagra, iv. 1. 2. 15. iv. 2. 4. 9.
 Polypus of the lungs, i. 1. 3. 4.
 of the nose from worms, iv. 1. 2. 9.
 Pregnancy, ii. 1. 1. 12.
 Priapismus, i. 1. 4. 6. ii. 1. 7. 9.
 Proctalgia, i. 2. 4. 18.
 Prolapsus ani, i. 1. 4. 9.
 Pruritus, i. 1. 5. 9.
 narium a vermis, iv. 2. 2. 6.
 Psora, ii. 1. 5. 6.
 imaginaria, iii. 1. 2. 22.
 Pterigion, ii. 1. 4. 2.
 Ptyalismus. See Salivatio.
 Pubis and throat sympathize, iv. 2. 1. 7.
 Puerperal fever, i. 2. 4. 9. ii. 1. 6. 16.
 insanity, iii. 1. 2. 1.
 Pulchritudinis desiderium, iii. 1. 2. 12.
 Putrefaction of trees, iv. 1. 4. 3.
 Pulse full, why, i. 1. 1. 1.
 strong, how determined, i. 1. 1. 1. Suppl. i. 16. 10.
 soft in vomiting, iv. 2. 1. 17.
 intermittent, iv. 2. 1. 18.
 quick from paucity of blood, Suppl. i. 11. 4.
 quick sometimes in sleep, iii. 2. 1. 12.
 quick in weak people, iii. 1. 1. iii. 2. 1. Suppl. i.
 4.
 slower by swinging, iv. 2. 1. 10.
 quick in chlorosis, i. 2. 3. 10.
 Punctæ mucosæ vultus, i. 2. 2. 9.
 Purging. See Diarrhoea.
 Pus diminished, i. 2. 2. 3.
 ... distinguished from mucus, ii. 1. 6. 6.

R.

Ratiocinatio verbosa, iii. 2. 2. 3.
 Rabies, iii. i. 2. 18.
 Rachitis, i. 2. 2. 15.
 Raucedo catarrhal. ii. i. 3. 5.
 paralytic. iii. 2. i. 5.
 Reasoning, false, iii. 2. 2. 3.
 Recollection, loss of, iii. 2. 2. 1.
 Recti paralysis, iii. 2. i. 7.
 scirrhous, i. 2. 3. 23.
 Red-gum, ii. i. 3. 12. i. i. 2. 3.
 Redness from heat, ii. i. 7. 7.
 of joy, ii. i. 7. 8.
 after dinner, iv. i. i. i.
 of anger, iv. 2. 3. 5.
 of guilt, iv. 2. 3. 6.
 of modesty, iv. 2. 3. 6.
 Respiration, ii. i. i. 2.
 quick in exercise, ii. i. i. 3.
 in softness of bones, i. 2. 2. 14.
 Restlessness, iii. i. i. i.
 Retroversio uteri, i. 2. i. 14.
 Reverie, iii. i. 2. 2. iv. 2. 4. 2.
 Rhaphania, iii. i. i. 6.
 Rheumatism, iv. i. 2. 16.
 of the joints, iv. i. 2. 16.
 of the bowels, iv. i. 2. 16.
 of the pleura, iv. i. 2. 16.
 suppurating, iv. i. 2. 16.
 from sympathy, iv. 2. 2. 13.
 chronical, i. i. 3. 12. iii. i. i. 6.
 venefection in, iv. i. 2. 16.
 Rickets, i. 2. 2. 15.
 Ring-worm, ii. i. 5. 10.
 Ritus, iii. i. i. 4. iv. 2. 3. 3.
 fardonicus, iv. i. 2. 4.
 invitus, iv. i. 3. 3.
 Rubeola, ii. i. 3. 10.
 Rubor a calore, ii. i. 7. 7.
 jucunditatis, ii. i. 7. 8.
 pransorum, iv. i. i. i.
 Ructus, i. 3. i. 2.
 Ruminatio, i. 3. i. i. iv. 3. 3. i.

S.

Sailing in phthisis, ii. 1. 6. 7.
 Salivation warm, i. 1. 2. 6.
 lymphatic, i. 3. 2. 2.
 sympathetic, iv. 1. 2. 5.
 in low fevers, i. 1. 2. 6.
 Salt of urine, i. 1. 2. 4. i. 1. 3. 9.
 Satyriasis, iii. 1. 2. 16.
 Scabies. See Psora.
 Scald-head, ii. 1. 5. 11.
 Scarlatina, ii. 1. 3. 11.
 Sciatica frigida, i. 2. 4. 15.
 Scirrhus, j. 2. 3. 22.
 suppurans, ii. 1. 4. 14.
 of the rectum, i. 2. 3. 23.
 of the urethra, i. 2. 3. 24.
 of the oesophagus, i. 2. 3. 25.
 Scorbatus, i. 2. 1. 15.
 suppurans, ii. 1. 4. 14.
 Scrofula, i. 2. 3. 21.
 suppurating, ii. 1. 4. 13.
 produces insanity, iii. 1. 2.
 Scurf of the head, i. 1. 3. 6.
 of the tongue, i. 1. 3. 1.
 Scurvy, i. 2. 1. 15.
 suppurating, ii. 1. 4. 14.
 Sea-air in phthisis, ii. 1. 6. 7.
 Sea-sickness, iv. 2. 1. 10. Suppl. i. 8. 3.
 Seat, descent of, i. 1. 4. 9.
 Seed, ejection of, ii. 1. 1. 11.
 See-saw of old people, iii. 2. 1. 2.
 Sensation inert, Suppl. i. 6. 4.
 Sensitive association, law of, iv. 2. 2. 2.
 Setons, ii. 1. 6.
 Shingles, ii. 1. 5. 9.
 Shoulder, pain of, iv. 2. 2. 9.
 Shrieking, iii. 1. 1. 3.
 Sicknes, i. 2. 4. 4. i. 3. 2. 3.
 cured by a blister, iv. 1. 1. 3.
 by warm skin, iv. 1. 2. 2. Suppl. i. 11. 4.
 by whirling, i. 1. 1. 4.
 by swinging, Suppl. i. 15. 3.
 by hydrocarbonate gas, Suppl. i. 15. 3.
 See Nausea.

Sight

Sight acuter, i. 1. 5. 1.
 impaired, i. 2. 5. 2.
 Side, chronical pain of, i. 2. 4. 14.
 Sighing and sobbing, iii. 1. 2. 10.
 Sitis calida, i. 2. 4. 1.
 ... frigida, i. 2. 4. 1.
 ... defectus, ii. 2. 2. 2.
 Skin pale in old age, i. 2. 2. 2.
 from cold, i. 2. 2. 2.
 Skin dry, i. 1. 3. 6.
 yellowish, i. 2. 2. 2.
 bluish and shrank, i. 2. 1. 1.
 reddish, ii. 1. 3. 1.
 cold after meals, iv. 2. 1. 1.
 Sleep, iii. 2. 1. 12.
 interrupted, i. 2. 1. 3.
 periods in, iv. 2. 4. 1.
 with quick pulse, iii. 2. 1. 12.
 disturbed by digestion, iii. 2. 1. 12.
 Sleep-walkers, iii. 1. 1. 9.
 Small-pox, ii. 1. 3. 9.
 why distinct and confluent, Sup. i. 15. 2.
 i. 16. 8.
 secondary fever of, ii. 1. 6. 12.
 eruption of, iv. 1. 2. 12.
 Smarting, i. 1. 5. 10.
 Smell acuter, i. 1. 5. 3.
 impaired, i. 2. 5. 7.
 Sneezing, ii. 1. 3. iv. 1. 2. 2.
 Snow in scrofula, i. 2. 3. 21.
 in paraly sis, iii. 2. 1. 4.
 Snuff in hydrocephalus, i. 2. 3. 12.
 Softness of bones, i. 2. 2. 14.
 Somnambulism, iii. 1. 1. 9.
 Somnium, ii. 1. 7. 4.
 Somnus, iii. 2. 1. 12. iv. 2. 4. 1.
 interruptus, i. 2. 1. 3.
 Spasm of diaphragm, iii. 1. 1. 11.
 of the heart, iii. 1. 1. 11.
 Spine distorted, i. 2. 2. 16.
 protuberant, i. 2. 2. 18.
 bifid, i. 2. 2. 19.
 Spitting blood, i. 1. 1. 4. i. 2. 1. 9.
 Spleen swelled, i. 2. 3. 18. Suppl. i. 16. 6.

Splenitis, ii. 2. 2. 13.
 Spots on the face, i. 2. 2. 9.
 seen on bed-clothes, i. 2. 5. 3.
 Squinting, i. 2. 5. 4.
 in hydrocephalus, i. 2. 5. 4.
 Stammering, iv. 2. 3. 1.
 Stays tight, injurious, ii. 1. 1. 12.
 Sterility, ii. 2. 2. 4.
 Sternutatio, ii. 1. 1. 3. iv. 1. 2. 2.
 a lumine, iv. 2. 1. 2.
 Stimulants, their twofold effect, ii. 1. 2. 6.
 injure weak people, i. 1. 2. 3.
 except the sorbentia, i. 1. 2. 3.
 Stocks for children dangerous, ii. 2. 2. 17.
 Stomach, torpor of, i. 2. 1. 2. Suppl. i. 12. i. 8. 19.
 i. 16. 6.
 Stomach, inflammation of, ii. 1. 2. 10. ii. 1. 3. 19.
 its association, iv. 1. 1.
 cause of fever, Suppl. i. 8. 8.
 Stones in the bladder. See Calculi.
 in horses, i. 1. 3. 5. i. 1. 3. 10.
 Strabismus, i. 2. 5. 4.
 Strangury, ii. 1. 1. 12. iv. 2. 2. 2.
 convulsive, iv. 2. 2. 3.
 Strength and debility metaphors, i. 2. 1.
 Stridor dentium, iii. 1. 1. 12.
 Studium inane, iii. 1. 2. 2. iv. 2. 4. 2.
 Stultitia inirritabilis, i. 2. 5. 1.
 insensibilis, ii. 2. 1. 1.
 voluntaria, iii. 2. 2. 2.
 Stupor, i. 2. 5. 10. Suppl. i. 15.
 Sty, ii. 1. 4. 4.
 Subsultus tendinum, iii. 1. 1. 5.
 Sudor. See Sweats.
 Suggestion, flow, iv. 2. 3. 8.
 Superannuation, iv. 2. 3. 8.
 Surprise, i. 1. 5. 12.
 Sweats, warm, i. 1. 2. 3.
 cold, i. 2. 3. 2.
 lymphatic, i. 3. 2. 7.
 asthmatic, i. 3. 2. 8. iv. 3. 1. 2.
 covered in bed, iv. 1. 1. 2. Suppl. i. 11. 6.
 of the brows, i. 1. 2. 3.
 in fever fits, why, i. 1. 2. 5.

Sweats,

Sweats from exercise, i. 1. 2. 3.
 from heat, i. 1. 2. 3.
 from medicines, i. 1. 2. 3.
 Sweaty hands cured, i. 3. 2. 7.
 Swinging, ii. 1. 6. 7.
 makes the pulse slower, iv. 2. 1. 10.
 Swing centrifugal, Suppl. i. 15. and 3.
 Symbols of ideas, iv. 2. 3. 8.
 Sympathy direct and reverse, iv. 1. 1. F.
 with others, iii. 1. 2. 24.
 of various parts, Suppl. i. 11. 5.
 reverse of lacteals and lymphatics, Suppl. i. 11. 5.
 of capillaries, Suppl. i. 11. 5.
 direct of stomach and heart, Sup. i. 11. 5.
 how to destroy, iv. 2. 2. 8.
 of throat and pubis, iv. 2. 1. 7.
 Syncope, i. 2. 1. 4.
 epileptic, iii. 2. 1. 15.
 Syngultus, ii. 1. 1. 6.
 nephriticus, iv. 1. 1. 7.
 Syphilis, ii. 1. 5. 2.
 Syphilis imaginaria, iii. 1. 2. 21.
 Syphon capillary of cloth, ii. 1. 3. 1.

T.

Tactus acrior, i. 1. 5. 5.
 imminutus, i. 2. 5. 6.
 Tædium vitæ, iii. 2. 1. 2, iii. 1. 2. 11. iii. 2. 1. 8.
 Tænia, i. 1. 4. 11.
 Tape-worm, i. 4. 1. 1.
 Tapping at the navel, i. 2. 3. 13.
 Tarditas senilis, iv. 2. 3. 8.
 paralytica, iv. 2. 3. 7.
 Tarstitis, ii. 1. 4. 3.
 Taste. See Gustus.
 bitter, not from bile, i. 1. 3. 1.
 Tears sympathetic, iv. 1. 2. 1. iii. 1. 1. 10.
 Teeth, to preserve, i. 1. 4. 5.
 fall out whole, ii. 1. 4. 7.
 Tenesmus, ii. 1. 1. 11.
 calculosus, iv. 1. 2. 8.
 Testium dolor nephriticus, iv. 2. 2. 11.
 tumor in gonorrhœa, iv. 1. 2. 18.

Testium

Testium tumor in parotidite, iv. 1. 2. 19.
 Tetanus trismus, iii. 1. 1. 13.
 dolorificus, iii. 1. 1. 14.
 Thirst. See Sitis and Adipsia.
 Thread-worm, i. 1. 4. 12.
 Throat swelled, i. 2. 3. 20.
 thickens at puberty, iv. 2. 1. 7.
 grown up, i. 2. 3. 25.
 Thrush, ii. 1. 3. 17.
 Tic douloureux, i. 2. 4. 12.
 Tickling, i. 1. 5. 8.
 Timor orci, iii. 1. 2. 15.
 lethi, iii. 1. 2. 14.
 paupertatis, iii. 1. 2. 13.
 Tinéa, ii. 1. 5. 11.
 Tinnitus aurium, iv. 1. 1. 15.
 Titillatio, i. 1. 5. 8.
 Titubatio linguæ, iv. 2. 3. 1.
 Tobacco, smoke of in piles, i. 2. 1. 6.
 Tongue dry, i. 1. 3. 1. Suppl. i. 2.
 coloured mucus, i. 1. 3. 1.
 Tonfillitis, ii. 1. 3. 3.
 Tonfils swelled from bad teeth, i. 2. 3. 21. ii. 1. 3. 3.
 Tooth ach, i. 2. 4. 12. ii. 1. 4. 7.
 Tooth-edge, iv. 1. 2. 3.
 Tooothing, i. 1. 4. 5.
 Tooth-powder, i. 1. 4. 5.
 Torpor of the liver, i. 1. 2. 6.
 of the pancreas, i. 2. 2. 7.
 of the lungs, Suppl. 1. 9.
 of the stomach, Suppl. 1. 10.
 of the heart, Suppl. 1. 10.
 Touch. See Tactus.
 deceived three ways, i. 2. 5. 9. iv. 2. 1. 10.
 Transfusion of blood, i. 2. 3. 25. Suppl. i. 14. 4.
 Translation of matter, i. 3. 2. 9.
 of milk, i. 3. 2. 10.
 of urine, i. 3. 2. 11.
 Transparency of cornea, i. 1. 4. 1.
 of crystalline, i. 2. 2. 13.
 of air before rain, i. 1. 4. 1.
 Tremor of old age, iii. 2. 1. 3.
 of fever, iii. 1. 1. 2.
 of anger, iv. 3. 1. 4.

Tremor

Tremor of fear, iv. 1. 2. 5.
 Tricks of the face, iii. 1. 1. 5. iv. 1. 3. 2.
 Trismus, iii. 1. 1. 13.
 dolorificus, i. 2. 4. 12.
 Twitchings of the face, iv. 1. 3. 2.
 Tussis ebiorum, ii. 1. 1. 5.
 convulsiva, ii. 1. 3. 8.
 hepatica, iv. 2. 1. 8.
 arthritica, iv. 2. 1. 9.
 periodica, iv. 3. 4. 2.
 a pedibus frigidis, iy. 2. 1. 7.
 Tympany, i. 2. 4. 9.
 Typhus, i. 2. 1. 1. ii. 1. 3. 1.

U.

Ulcers, healing of, i. 1. 3. 13.
 of the cornea, i. 1. 3. 14.
 from burns, i. 1. 3. 13.
 scrofulous, ii. 1. 4. 13.
 of the throat, ii. 1. 3. 3. ii. 1. 3. 11.
 of the legs, ii. 1. 4. 14.
 Unguim morsuncula, iv. 1. 3. 5.
 Urethra, scirrhus of, i. 2. 3. 24.
 fistula of, ii. 1. 4. 11.
 Urine, copious, coloured, i. 1. 2. 4.
 copious, pale, i. 2. 3. 5.
 diminished, coloured, i. 1. 3. 7.
 diminished, pale, i. 2. 2. 5.
 its mucus, salts, Prussian blue, i. 1. 2. 4.
 why less and coloured in dropfies, i. 1. 3. 7.
 translation of, i. 3. 2. 11.
 difficulty of, iii. 2. 1. 6.
 not secreted, i. 2. 2. 8.
 pale after meals, iv. 2. 1. 2.
 pale from cold skin, iv. 2. 1. 3.
 sediment in fevers, Suppl. i. 2. 3.
 pale in fevers, Suppl. i. 2. 3. and 5.
 Urticaria, ii. 1. 3. 16.
 Uteri-descensus, i. 1. 4. 8.
 retroversio, i. 2. 1. 14.

Varix,

V.

Varix, i. 2. 1. 19.
 Vacillatio senilis, iii. 2. 1. 2.
 Varicella, ii. 1. 3. 15.
 Variola, ii. 1. 3. 9.
 eruption of, iv. 2. 1. 12.
 Vasorum capil. retrogressio, i. 3. 3. 1.
 Venereal orgasm, iv. 1. 4. 4.
 disease, ii. 1. 5. 2.
 imaginary, iii. 1. 2. 21.
 Ventriculi ægritudo, i. 2. 4. 4.
 vesicatorio sanata, iv. 1. 1. 3.
 Vermes, i. 1. 4. 10.
 Vertigo rotatory, iv. 2. 1. 10.
 of sight, iv. 2. 1. 11.
 inebriate, iv. 2. 1. 12.
 of fever, iv. 2. 1. 13.
 from the brain, iv. 2. 1. 14.
 of the ears, iv. 2. 1. 15.
 of the touch, taste and smell, iv. 2. 1. 16.
 with vomiting, iv. 2. 3. 2.
 produces slow pulse, iv. 2. 1. 10.
 of blind men, iv. 2. 1. 10.
 use of mercurials in it, iv. 2. 1. 11.
 Vibices, i. 2. 1. 16. Suppl. i. 2. 7.
 Vigilia, iii. 1. 2. 3. iv. 1. 3. 6.
 Vinegar in petechiæ, i. 2. 1. 17.
 in scarlet fever, ii. 1. 3. 11.
 Vision acuter, i. 1. 5. 1.
 diminished, i. 2. 5. 2.
 expends much sensorial power, i. 2. 5. 3.
 Vita ovi, iv. 1. 4. 1.
 hiemi-dormientium, iv. 1. 4. 2.
 Vitus's dance, iv. 2. 3. 2.
 Volition, three degrees of, iii. 2. 1. 12.
 lessens fever, iii. 2. 1. 12. Suppl. i. 11. 6.
 produces fever, iii. 2. 1. 12.
 without deliberation, iii. 1. 1. iv. 1. 3. 2.
 Vomica, ii. 1. 6. 3.
 Vomitus, i. 3. 1. 4.
 Vomendi conamen inane, i. 3. 1. 8.
 Vomiting stopped, iv. 1. 1. 3. iv. 1. 1. F.
 voluntary, iv. 3. 3. 2.

Vomiting

Vomiting how acquired, iv. 1. 1. 2. F.
 vertiginous, iv. 3. 2. 3.
 from stone in ureter, iv. 3. 2. 4.
 from paralytic stroke, iv. 3. 2. 5.
 from tickling the throat, iv. 3. 2. 6.
 sympathizes with the skin, iv. 3. 2. 7.
 in haemoptoe, i. 1. 1. 4.
 from defect of association, iv. 2. 1. 10.
 Vulnerum cicatrix, i. 1. 3. 13.

W.

Watchfulness, iii. 1. 2. 3. iv. 3. 2. 5.
 Water-qualm, i. 3. 1. 3.
 Weakness, three kinds of, i. 2. 1.
 Whirling-chair, Suppl. i. 15. 3.
 Whirling-bed, Suppl. i. 15. 7. i. 2. 5. 5.
 White swelling of the knee, i. 2. 3. 19.
 Whitlow, superficial, ii. 1. 4. 5.
 internal, ii. 1. 2. 19.
 Wine in fevers, ii. 1. 3. 1. iv. 2. 1. 12.
 Winking, ii. 1. 1. 8. 1. 1. 4. 1. iv. 3. 2. 2.
 Winter-sleeping animals, iv. 1. 4. 2.
 Womb, descent of, i. 1. 4. 8.
 retroversion of, i. 2. 1. 14.
 inflammation of, ii. 1. 8. 16.
 Worms, i. 1. 4. 10.
 mucus counterfeits, i. 1. 3. 4.
 in sheep, i. 1. 4. 10.
 Wounds, healing of, i. 1. 3. 13.

Y.

Yawning, ii. 1. 1. 9.
 Yaws, ii. 1. 5. 5.

Z.

Zona ignea, ii. 1. 5. 9. iv. 1. 2. 11. ii. 1. 2. 14.

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